

NETWORK WORLD

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IBM revving up portfolio of databases

By Wayne Eckerson
Senior Editor

SAN FRANCISCO — IBM this week will announce enhancements to key components of its Information Warehouse framework that will make it easier for users to query and update data in IBM relational databases.

According to sources, IBM will enhance its host-based DB2 relational database to support multisite updates using two-phase commit technology. Big Blue will also unveil a relational database for its AIX-based RISC System/6000 and will be joined by developers pledging to build applications for the new database.

In addition, IBM will announce support for the SQL Access Group's (SAG) Call-Level Interface (CLI), two-way data synchronization between DB2 and IMS, and a utility that tracks data in a distributed environment.

Analysts applauded IBM's deployment of multisite update, which allows applications to access data across multiple distributed databases with a single SQL
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Lights, camera, action! Novell lights up INTEROP for NetWare 4.0 intro.

UPS selects IBM's 6611 router for net upgrade

By Jim Duffy
Senior Editor

MAHWAH, N.J. — Passing up the leading router vendors for its traditional systems supplier, United Parcel Service (UPS) last week said it selected IBM to provide at least 400 multiprotocol routers for use in the first phase of a major net overhaul.

UPS said it is installing IBM's 6611 Network Processors in the U.S. and Canadian portions of its private UPSnet network to consolidate Systems Network Architecture and multiprotocol local-area network traffic onto a single backbone and to foster peer com-

munications among diverse computing systems. UPSnet is a global packet-switched network that supports 1,200 IBM Token-Ring LANs and serves more than 25,000 users in 46 countries.

IBM bested bids from Cisco Systems, Inc. and Wellfleet Communications, Inc. on the strength of its Advanced Peer-to-Peer Networking (APPN) and Data Link Switching support. Those technologies are key to UPS' plan to transform its hierarchical network into a more flexible peer-to-peer structure that can support LAN traffic as well as traditional
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Novell shifts playing field with NetWare 4.0

LAN giant tries to stay one step ahead of pack as desktop OS providers stake claims to its turf.

By Caryn Gillooly
Senior Editor

WASHINGTON, D.C. — Against a multimedia backdrop of 1,000 flickering monitors and floor-to-ceiling projection screens, Novell, Inc. officials last week unveiled to INTEROP attendees here and audiences

lights, Novell made clear it was not just bringing out a new version of the stalwart product; it was showing the world how it intends to stay ahead of hard-charging rivals in the networking game.

The lines between personal computer operating systems and



Top brass Ray Noorda, Jan Newman, Bob Young headline 4.0 debut.

throughout the world what they called the most important product in Novell history: NetWare 4.0.

A phalanx of top executives from Raymond Noorda down echoed the "Know No Bounds" mantra of 4.0 and demonstrated its much-discussed new features. But amidst all the music and

network operating systems (NOS) are fading fast. Microsoft Corp.'s Windows NT promises peer-to-peer connectivity, as well
(continued on page 46)

Net features shine as NT nears reality

By Fredric Paul
Senior Editor

ORLANDO, Fla. — Microsoft Corp. last week announced release of Windows NT Beta 2, which boasts big performance, networking and other improvements over earlier beta versions and is said to have most of the features that will be in the operating system's commercial release.

Also last week, Microsoft began shipping Win32s, an application program interface that allows NT programs to run unmodified under Windows 3.1, and demonstrated offerings that will follow on the release of NT, such as the Hermes management system and SNA Server.

Finally, Microsoft Chairman Bill Gates announced pricing for
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Users demand more say in ATM product directions

By Bob Wallace
Senior Editor

WASHINGTON, D.C. — Network executives at a newly established ATM user group last week called for more say in ATM product and service development, charging that current offerings are being developed in a vacuum.

Dozens of users attended the meeting of the Enterprise Network Users Roundtable (ENUR), which was formed earlier this year with the charter to provide user input into the development of Asynchronous Transfer Mode (ATM) products.

"We desperately need a say in vendor and carrier plans for ATM products and services," said Walter Gould, senior telecommuni-

cations engineer with Boeing Computer Support Services, Inc. "And we won't buy ATM-anything until we have a formal process for delivering user input to the forum and receiving comment back."

Vendors and carriers currently follow ATM specifications defined by the ATM Forum, a group made up almost entirely of equipment vendors and carriers.

Although users are welcome to join the forum, full-voting membership carries a \$10,000 annual fee, an expense many cannot justify. ENUR, a group that charges no membership fee and welcomes only users, provides an alternative vehicle through which users' voices can be heard.

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NETLINE



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NEW LOW-END IBM ROUTER and MPTN software debut at INTEROP 93. Page 8.

3COM TWEAKS bridge/routers to enhance SNA support. Page 8.

DEC DRAFTS ITS plan for mi-

grating users to ATM. Page 9.

EPILOGUE, SNMP RESEARCH ship new SNMP wares. Page 9.

HUGHES SUBSIDIARIES to build interoperable ATM products. Page 10.

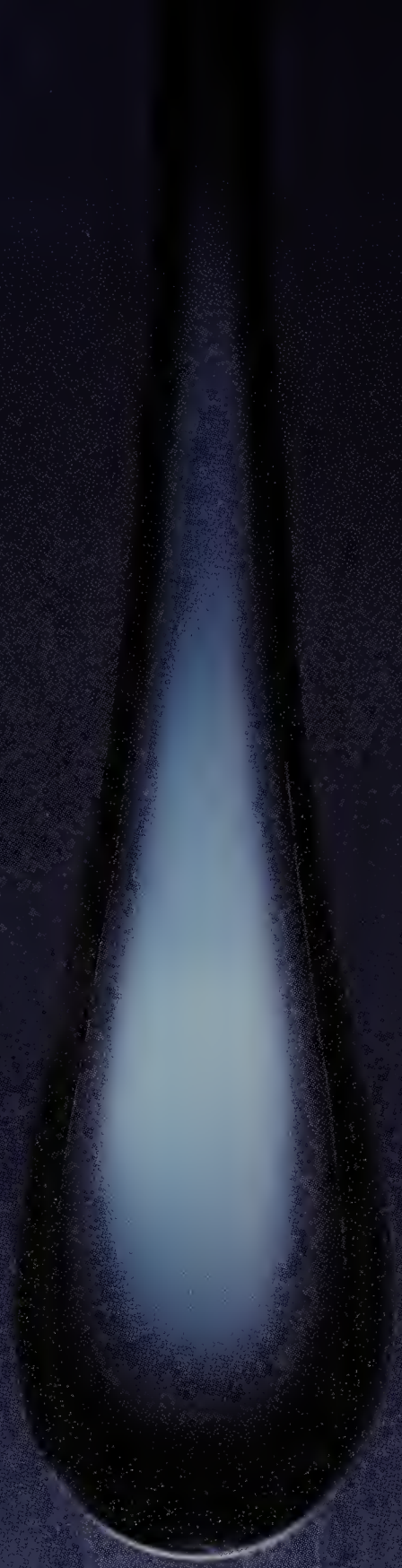
NEW SERVICES, FUNCTIONS will give TCP/IP the boost it needs to support emerging technologies. Page 29.

Are You Ready?

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broadband needs are becoming much
more than a drop in the bucket.

IBM to issue APPN package for intellectual property

Vendors to develop own APPN NN code at a cost significantly less than licensing it from IBM.

By Michael Cooney
Senior Editor

WASHINGTON, D.C. — IBM will soon begin offering an Advanced Peer-to-Peer Networking (APPN) intellectual property package that will let third-party developers build SNA/APPN Network Node (NN) products without licensing all NN code from IBM.

The package will include APPN trademarks, patents and copyrights that will give vendors the right to develop their own APPN NN code without worrying about infringing on IBM patents.

Its availability may put a crimp in the plans of the Cisco Systems, Inc.-led Advanced Peer-to-Peer Internetworking (APPI) Forum, which has lambasted IBM for its high APPN license fees.

Sources indicate that the intellectual property package will cost about \$10,000, significantly less than licensing NN code from IBM for

IBM extends reach of 6611 router line. Page 8.

\$400,000 plus royalties. In order to build NN products today, vendors must license NN from IBM or use publicly available NN documentation from IBM and build it

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FCC tries to head off rate hikes for Tariff 12 users

Grants users 'fresh look' at possible transitions.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — The Federal Communications Commission stepped in last week to defuse a major battle between AT&T and users over whether AT&T can change Tariff 12 rates after a user notifies the carrier that it wants to move 800 traffic to another carrier.

AT&T claims that once it is notified that a customer plans to terminate a Tariff 12 deal and move to another carrier, the contract is void.

A spokesman said AT&T is justified in hiking the user's rates be-

cause Tariff 12 prices are based on term and volume commitments that the customer no longer can meet.

But users have complained loudly to the FCC that they should not be booted off Tariff 12 deals immediately. During the past two weeks, customers told the FCC they believe AT&T is trying to force them to stay put by threatening higher rates.

In response to user concerns, the FCC last week issued a notice laying some rules to govern Tariff 12 customer changes after 800 portability begins on May 1.

(continued on page 48)

HP to release new version of OpenView for Windows

By Caryn Gillooly
Senior Editor

WASHINGTON, D.C. — Hewlett-Packard Co. this spring is expected to roll out a new version of its OpenView for Windows product that will bring it up to par with the functionality of the Unix-based OpenView.

Further, under a technology agreement announced last week between HP and Intel Corp., Intel's LANdesk Manager and HP's OpenView for Windows will be bundled and sold as LANdesk/OpenView for Windows, which is expected to be



available in June.

The new version of OpenView, dubbed OpenView for Windows 7.0, is expected to have many of the higher end features of the Unix product, although the Windows version will cost less, according to a source within HP that requested anonymity.

Version 7.0 is expected to include automatic network mapping. In OpenView for Windows 6.0, administrators had to draw their own network maps based on their own knowledge of the devices on the network. With

(continued on page 48)

Briefs

Cisco demos APPI. Cisco Systems, Inc. last week demonstrated prototype software that implements Advanced Peer-to-Peer Internetworking (APPI) technology at INTEROP 93 Spring in Washington, D.C. APPI is an alternative technology to IBM's Advanced Peer-to-Peer Networking technology. Also, The APPI Forum, a group of 21 vendors backing APPI, held its second meeting at INTEROP, adding five new members: Arkhon Technologies, Ascom Timeplex, Inc., MCI Communications Corp., NCR Corp. and Unisys Corp.

NTI experiment goes awry, FCC says. The Federal Communications Commission last week ordered Northern Telecom, Inc. (NTI) to stop selling its Companion System wireless private branch exchange, which operates under an FCC experimental license. Frank Wright, chief of the FCC licensing branch, said the agency received several complaints, including one from the U.S. Postal Service, that NTI was not properly informing potential customers that the equipment is experimental. He also said NTI has refused to comply with FCC rules that require it to submit a list of customers using the device.

According to FCC records, NTI has sold 100 of the 5,000 units it is permitted to market under the FCC experimental license.

Clearpoint execs, users to find home in Tudor. A new bridge/router company was formed last week by several former executives of Clearpoint Research Corp., which closed its doors earlier this month.

The new company, Tudor Technology, Inc., is based in Sherborn, Mass., and will service Clearpoint customers and continue development work that Clearpoint had under way before its demise. A spokesman for Tudor said the company expects to receive a letter of intent for venture capital funding this week.

New DMTF spec, plans unveiled. The Desktop Management Task Force last week released a new version of its preliminary Distributed Management Interface specification, which is designed to enable standardized management of desktop machines across networks. The specification is expected to be in beta test by June, and products based on it could appear by the fall. Representatives from IBM, Intel Corp., Microsoft Corp. and Standard Microsystems Corp. also outlined plans to support the new specification.

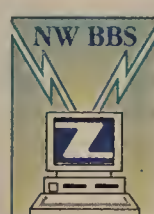
Borland builds database NLM. Borland International, Inc. of Scotts Valley, Calif., last week announced a version of its InterBase relational database management system that will run on Novell, Inc.'s NetWare 4.0 as a NetWare Loadable Module (NLM). The InterBase NLM will be a multithreaded SQL relational database server that takes advantage of NetWare 4.0 features, such as memory protection options and file compression. Borland and Novell recently teamed up to put forth the Integrated Database Application Programming Interface. Pricing and availability were not provided.

Sprint expands frame relay reach. Sprint Corp. last week said its frame relay service is now available to users with sites in Canada, France and Germany. Sprint has the network switches needed to support frame relay in Ottawa, Montreal, Toronto and Vancouver, as well as Frankfurt, Germany, and Paris. The carrier said it takes 45 to 180 days after receipt of order to provision frame relay from its switches, which initially support 256K bit/sec access port speeds.

CONTACTS



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Attachmate, Powersoft ally on client/server tools

Attachmate also boosts TCP/IP connectivity wares.

By Bob Brown
Senior Editor

WASHINGTON, D.C. — Attachmate Corp. last week announced an alliance with Powersoft Corp. under which Attachmate will release a set of tools for integrating host data into client/server applications designed with Powersoft's PowerBuilder development environment.

Attachmate also detailed increased Transmission Control Protocol/Internet Protocol support for its Extra for Windows terminal-emulation software.

The new Attachmate Extra Tools for PowerBuilder is object-oriented Microsoft Corp. Windows software designed to help PowerBuilder users develop client/server applications capable of accessing information from both relational and nonrelational databases.

Attachmate is providing the ability to build applications that can access data stored on mainframes, such as in IBM DB2, IMS and AS databases. The key to this is providing access to nonrelational databases, such as IBM's IMS, because PowerBuilder applications can already access server-based relational systems.

Applications will be able to access nonrelational data via multiple simultaneous mainframe sessions, even if data resides on

diverse systems.

"We have an immediate need in our client/server environment to access mainframe tables for ad hoc queries and spontaneous downloads to local databases," said Bob Glazener, application systems supervisor for Halliburton Co., an oil field service and construction company in Houston that pushed Attachmate to work with Powersoft. "We want that under the control of the client/server applications so users don't have to log on separately to access mainframe data."

Included in the Attachmate tool kit is a library of objects, dubbed PowerBuilder Custom Objects, that navigate through the host and can be used to build icons representing host-based data or function calls to the host.

The tool kit also contains the Attachmate Common Function Library, which supports frequently used functions for capturing host data, transferring files and performing other tasks. Using the functions can save developers from writing the many lines of code needed for even basic chores, such as starting up a session.

According to Matt Highsmith, vice president of marketing at Attachmate, Extra Tools for PowerBuilder will enable users to migrate to client/server without

discarding legacy systems.

Attachmate and Powersoft will jointly market the tools and partner on support. Available in May, Extra Tools for PowerBuilder will be priced at \$195.

Separately, Attachmate announced a new feature for its Extra for Windows terminal-emulation software that will enable users to run Telnet 3270 connections to mainframes via their choice of TCP/IP nets. The product enhancements are being made to support the growing integration of TCP/IP and IBM Systems Network Architecture nets, Highsmith said.

Attachmate will support Microsoft's Windows Socket (WinSock) Version 1.1 application program interface for allowing Telnet 3270 connections over TCP/IP. As a result, Extra for Windows will support host connectivity via any WinSock 1.1-compliant TCP/IP stack.

Attachmate will provide direct links to TCP/IP stacks from a number of vendors, as well, so that users can achieve connectivity immediately, without waiting for WinSock 1.1 TCP/IP stacks to hit the market. Attachmate already supports the File Transfer Protocol's (FTP) TCP/IP implementation but will add support for TCP/IP stacks from Beame & Whiteside Software, Ltd., Hewlett-Packard Co., Microsoft, Novell, Inc., 3Com Corp. and The Wollongong Group, Inc. in addition to FTP 2.1.

Extra for Windows using WinSock and direct TCP/IP support will be available in May for \$425 or \$75 for current users. ■

Plan for future air traffic control system off course

By Ellen Messmer
Senior Correspondent

WASHINGTON, D.C. — At a congressional hearing last week, IBM and the Federal Aviation Administration acknowledged that mismanagement and technical problems on a new \$5 billion air traffic control system have left the project in jeopardy.

IBM has not solved the design problem of creating a distributed system in which the hundreds of workstations to be used by air traffic controllers can share and process all of the required information simultaneously, a top IBM official last week told a congressional subcommittee looking into cost overruns and delays on the Advanced Automation System (AAS) project.

In the day-long hearing before the House Subcommittee on Aviation, the FAA also accepted blame for the troubled project, saying

the agency's lack of firm operational requirements and administrative weakness — problems that still exist — have added to the project's woes.

The FAA awarded the 10-year AAS contract in 1988 to IBM, with partners Raytheon Co. and Computer Sciences Corp. The contract called for a new air traffic control system to replace the current radar and console equipment, which is about 30 years old. Today's air traffic control terminals cannot share information, and most of the flight-path information is recorded by hand.

As called for under AAS, this older equipment, which is in 20 en-route centers (areas that monitor flight traffic) throughout the U.S., is scheduled to be replaced starting in 1996 in Seattle. New high-resolution consoles will be installed on local-area networks linked to a nationwide

distributed net, called the Initial Sector Suite System (ISSS).

In theory, the new computers would be able to sort through nationwide flight and weather hazard data to plot aircraft flight plans from start to finish. Improved radar systems would allow aircraft to take more direct routes instead of relying on existing charted air corridors, bringing wider use of airspace and greater fuel efficiency.

But delays are postponing completion of the project until at least 2002 and have added millions of dollars in cost overruns. The FAA and IBM are wrangling over IBM's recent demand for another \$235 million to complete AAS under a 14-month delay.

Also, the General Accounting Office (GAO) last week released a report showing that the AAS delays have forced the FAA to initiate several interim projects costing \$715 million to sustain the current air traffic control system.

IBM Vice President Gerald Ebker, chairman and chief executive officer of IBM's Federal Sys-

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MCI, SunConnect team up on integrated management

By Bob Brown
Senior Editor

WASHINGTON, D.C. — In an effort to let users manage their local- and wide-area networks from a single platform, SunConnect last week announced the integration of its SunNet Manager system with an MCI management offering for frame relay and SMDS.

SunConnect also rolled out enhancements to its SunLink IBM Systems Network Architecture connectivity software and announced a free offer under which users can swap out their Lexcel Lance+ Simple Network Management Protocol manage-

ment systems for SunNet Manager.

Under the SunConnect-MCI Communications Corp. agreement, MCI's HyperScope frame relay and Switched Multimegabit Data Service (SMDS) management software will run as an application in SunNet Manager. HyperScope is designed to give users a view of their piece of MCI's frame relay and SMDS net and access to various network statistics, such as usage.

Although HyperScope was announced last fall, MCI provided the first detailed explanation of the product at last week's an-

(continued on page 10)



Crescendo, NTI partner on FDDI

By Skip MacAskill
Staff Writer

WASHINGTON, D.C. — Northern Telecom, Inc. and Crescendo Communications, Inc. last week said they will develop a line of FDDI products that will conform to the emerging FDDI-over-twisted pair standard.

The first offerings from that alliance were also unveiled and included Fiber Distributed Data Interface concentrators and workstation adapters, as well as management software to monitor and control the products.

Devices developed by the companies will comply with ANSI's X3T9.5 standard, which covers 100M bit/sec FDDI — dubbed Copper Distributed Data Interface (CDDI) — over shielded and unshielded twisted-pair wiring.

The first products in the X-DDI

line include two eight-port FDDI work group concentrators. The X-DDI-8U supports Category 5 unshielded wiring. With the addition of an interface card, the user can add an A and B fiber port to the device for cascading purposes or two additional copper ports.

The unshielded twisted-pair connections will support devices as far away as 100 meters on Category 5 wiring, while the multimode fiber links have a 2-km maximum.

The device supports the Simple Network Management Protocol as well as Station Management Version 6.2. It is field-upgradable to Version 7.2.

The X-DDI-8F model supports eight multimode fiber ports and, similar to the copper version, offers the two optional ports and SNMP/SMT management. It has the same distance limitations. The products will be shipping in the second quarter, at which time pricing will be announced.

The pair aired X-DDI adapters for SBus, Micro Channel Architecture (MCA) and Extended Industry Standard Architecture

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Get in touch with the R.A.F.

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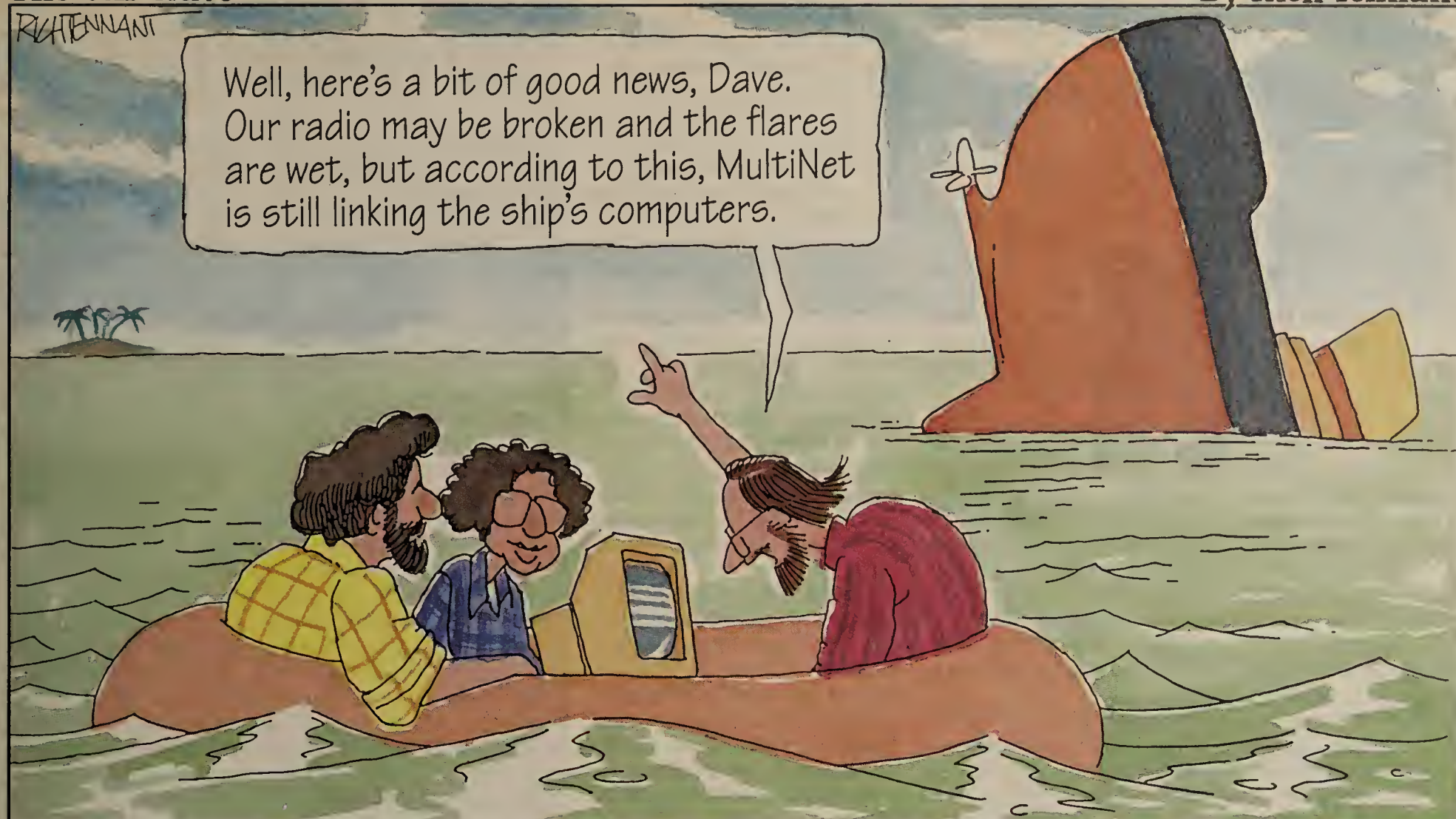
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IBM unveils low-end router and its first MPTN wares

By Michael Cooney
Senior Editor

WASHINGTON, D.C. — IBM last week extended its multiprotocol networking reach by announcing a new remote branch office router and software that lets existing applications run over a variety of transport networks.

IBM announced at INTEROP 93 Spring here a low-end 6611 Network Processor router and its first Multiprotocol Transport Networking (MPTN) products, which let existing Systems Network Architecture or Transmission Control Protocol/Internet Protocol applications work over either SNA or TCP/IP transports.

IBM extended the reach of its 6611 router line to the remote branch office by announcing the 6611 Model 120. The new router supports one local port that can be configured for token ring or Ethernet. On the wide-area side, it can support two V.35/36 or EIA 422/449 interfaces, one X.25 or four Synchronous Data Link Control interfaces.

The Model 120 runs the same software as the larger 6611s, the Models 140 and 170, which support four or seven ports, respectively. Therefore, it supports the

same features, including Data Link Switching (DLS), Network Basic I/O System DLS over Token Ring or Ethernet, and Advanced Peer-to-Peer Networking Network and End Node functions.



Jon Fjeld

The Model 120 will be available May 28 for \$6,995.

With its SNA and NETBIOS support, the product should compete well with low-end routers from Cisco Systems, Inc. and Wellfleet Communications, Inc., said Jon Fjeld, director of routing systems products for IBM.

"We don't find many users mixing routers from different vendors, so we are now offering users the blocks to build a complete router network out of 6611's," Fjeld said.

As expected, IBM also announced its first MPTN products for MVS mainframes and OS/2, as well as the third-party software developers' tools that will help bring MPTN to numerous platforms ("IBM going multiprotocol at INTEROP," *NW*, March 1).

Mark Pozefsky, IBM MPTN products and systems manager, said MPTN products employ mapping techniques and algorithms that let users run their existing applications over any transport mechanism without changes to the application. They also reduce the number of protocols and eliminate the need for parallel networks in the corporate environment.

IBM's first two MPTN products — known as the Multiprotocol Transport Feature (MPTF) for OS/2 and MPTF for MVS/ESA — support the transfer of SNA data over TCP/IP nets and of TCP/IP data over SNA. Third-party software developers will add DECnet, Open Systems Interconnection and other protocol support to MPTN.

MPTF for OS/2 will also let users running applications written to IBM's Common Programming Interface for Communications (CPI-C), exchange data with other CPI-C applications over a TCP/IP net. Until now, CPI-C, IBM's high-level application program interface, worked only with IBM LU 6.2 protocols.

IBM said future versions of MPTF for OS/2 and MVS will let existing 3270 applications communicate over TCP/IP nets and a planned OS/2 MPTF gateway will let users transfer data from TCP/IP applications between TCP/IP and SNA nets. MPTF sup-

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IBM details hub plan

WASHINGTON, D.C. — IBM last week outlined planned enhancements for its 8250 hub, including support for Asynchronous Transfer Mode (ATM) links and improved multivendor networking.

The ATM capabilities will be based on the "low-speed" ATM plan IBM submitted to the ATM Forum last month. That plan calls for ATM links to the desktop over ordinary telephone wire at speeds up to 25M bit/sec, a capability IBM intends to add to the 8250 in the next year or so. IBM also intends to add an "emulation and interconnect service" that would give existing local-area network applications on token-ring, Ethernet and Fiber Distributed Data Interface LANs access to ATM services.

The new service will be based on workstation or server software that packages traditional LAN packets into ATM-compatible cells so the data can travel via ATM links to the hub and take advantage of wide-area ATM services.

Mark Knittel, IBM's director of network integration products, said IBM and its 8250 hub partner, Chipcom Corp., are working on developing low-cost interfaces that will provide a migration path for ATM to the desktop.

With high-speed links such as ATM connections, IBM hopes to improve the hub's support for multimedia and videoconferencing applications. IBM also expects to add improved network management features, such as the ability to automatically track changes to a device's configuration.

"Users have to be comfortable putting enterprise applications on LANs, and the hub plays a key role there," Knittel said. "We want to enable new applications and incorporate new technologies while not forcing users to throw out what they have today."

In other IBM news last week, Big Blue announced a partnership with ProTools, Inc. under which the two companies have integrated IBM's LAN Network Manager with ProTools' Network Control Series network monitoring and analysis software. ProTools' Simple Network Management Protocol-based system will feed information from token-ring or Ethernet LANs to LAN Network Manager, which can be used to view the data or pass it to IBM's host-based NetView network management system.

The integrated product is available now.

— Michael Cooney and
Bob Brown

Firms to go forward with 100Base-VG

By Joanne Cummings
Senior Writer

PALO ALTO, Calif. — Hewlett-Packard Co. and AT&T Microelectronics said last week that 10 vendors have committed to delivering products adhering to their 100Base-VG specification for Ethernet at 100M bit/sec.

Some of the vendors, including Wellfleet Communications, Inc. and Optical Data Systems, Inc. (ODS), said they intend to build 100Base-VG products whether or not the specification actually becomes a standard.

In addition to AT&T and HP, vendors intending to build 100Base-VG products include Alantec, Banyan Systems, Inc., Bytex Corp., Kalpana, Inc., Microsoft Corp., Novell, Inc., Proteon, Inc. and Ungermann-Bass, Inc.

"We believe in the technology HP and AT&T have proposed and think they will make significant inroads into the market because

it solves real customer needs," said Michael Grady, vice president of engineering at Wellfleet, which intends to offer routers supporting 100Base-VG.

Grady said Wellfleet will support the technology if it does not become a standard. "We want to be on the leading edge with HP and AT&T, and we think this technology is strong and is the right way to go."

Terry Gaston, vice president of marketing at ODS, offered the early market for 10Base-T products as an analogy. "Vendors made 10Base-T products available, and people were able to buy them before the actual standard was finalized," he said. "We think it's the same type of risk."

ODS plans to offer 100Base-VG-compliant hubs but declined to elaborate on how the firm would upgrade early users to products that adhere to the final standard.

Other vendors were more reserved. "We're taking a cautious approach," said a Bytex spokeswoman. "We support 100Base-VG because of the features it offers, like support for multimedia and collapsed backbone architectures," she said. "If it doesn't become a standard, we would reassess our plans."

Bytex currently plans to offer a 100Base-VG module for its Series 7700 Intelligent Switching Hub.

"We are still waiting on a decision [by the IEEE] about the most viable solution," said Ed Thomas, manager of hardware vendor relations at Banyan. "We have lined up behind HP and AT&T, but if it doesn't become a standard, I don't know if we'll build products for it. We're going to wait and see how things progress."

Thomas said Banyan currently plans to build software drivers to support 100Base-VG hardware.

Separately, the IEEE 802.3 working group investigating 100M bit/sec technology met last week and examined several technical proposals for various 100M bit/sec methods, but no final decisions were made.

Brice Clark, strategy and planning manager at HP's Roseville Networks Division, said that while it is too early to tell, the committee may eventually sanction two standards — one supporting 100Base-VG and the other supporting a proposal that includes carrier-sense multiple access with collision detection.

"We'll probably have a real decision by the end of our July meeting," he said. □

3Com delivers on second phase of its SNA strategy

By Skip MacAskill
Staff Writer

WASHINGTON, D.C. — 3Com Corp. last week delivered on the second phase of its SNA strategy when it announced enhancements that will help users of its bridge/routers move from Big Blue environments to LAN-based internetworks.

The company rolled out new software features that enable its NetBuilder product line to support Systems Network Architecture via Internet Protocol tunneling, as well as local acknowledgments for SNA sessions and broadcast throttling, the latter of which helps users control broadcast storms.

With tunneling, SNA data is encapsulated in IP packets and shipped over the same wide-area network link used for traditional local-area network traffic, obviating the need for separate lines

for SNA data.

The tunneling feature includes an option to provide local acknowledgments at both the local and remote router locations, thus reducing WAN backbone traffic and increasing bandwidth available for other applications.

Local acknowledgments eliminate unnecessary handshaking between the terminal and the host, an activity that consumes WAN bandwidth while tunneling traffic between SNA hosts and clients.

Because IBM networks are susceptible to broadcast storms from Network Basic I/O System traffic, 3Com also introduced a broadcast throttling feature that lets users control the rate at which broadcast and multicast traffic can be propagated across the WAN.

Users can create parameters

(continued on page 49)



DEC bares its plans to support ATM

By Jim Duffy
Senior Editor

WASHINGTON, D.C. — Digital Equipment Corp. last week mapped out a desktop-to-wide-area Asynchronous Transfer Mode (ATM) migration strategy that will commence with ATM connectivity for DEC's GIGAswitch FDDI switch.

Also, DEC plans to support Ethernet switching on a new hub to provide users with a growth path to ATM networking. Switched local-area networks provide dedicated LAN bandwidth to desktop workstations — in the case of Ethernet, 10M bit/sec — which brings benefits such as increased performance, logical segmentation and multimedia support.

DEC also intends to commercialize an experimental ATM switch and unveil a line of ATM workstation adapters by mid-1994. DEC officials outlined their

ATM migration strategy at the INTEROP 93 Spring show here last week.

ATM will appear first on the GIGAswitch, a 3.6G bit/sec, 22-port switch that performs switching between Fiber Distributed Data Interface LANs and provides access to wide-area networks.

GIGAswitch will sport a two-port ATM module by the end of the year that will support any combination of 155M bit/sec Synchronous Optical Network, T-3/E-3 or High Speed Serial Interface links. It will package FDDI traffic into 53-byte ATM cells and provide access to an ATM switch.

Port capacity on the GIGAswitch will be increased from 22 to 34 by year end, as well, DEC officials said.

DEC also plans to ship a new hub, called the DEChub 900, in the third quarter. In its initial release, DEChub 900 will support shared-media Ethernet, token ring and FDDI. But possibly before the end of this year, it will support dedicated 10M bit/sec Ethernet-to-desktop workstations as a precursor to migrating users to local ATM.

The DEChub 900, which was announced last fall ("DEC serves up additions to its Ethernet hub,"

NW, Oct. 19, 1992), will sport an ATM interface in mid-1994, allowing the device to segment LAN frames into ATM cells and send them to an ATM switch. The 2G bit/sec hub will support an ATM switching matrix sometime after that, DEC officials said.

A higher end ATM switch is currently under development at the University of Kansas and is undergoing trials there and at some customer sites. DEC did not elaborate on the so-called AN2 switch but said it will be unveiled in mid-1994. Analysts believe that it will support a switching capacity of 12.5G bit/sec.

The AN2 grew out of a cell network experiment at DEC laboratories in Palo Alto, Calif.

The company also declined to give many details on its ATM adapters, such as speeds and media support, opting to wait until their mid-1994 release. The adapters, which will support standard bus architectures, will be priced competitively, said Ralph Dormitzer, DEC group manager of Low End Networks and Communications.

DEC will develop its own ATM chipset to support its upcoming products, company officials said. ■

Traffic system off course

continued from page 6

tems Division, last week admitted that major technical problems remained unresolved in ISSS. "Two problems are the electronic flight strips and the other is continuous operations," Ebker told James Oberstar (D-Minn.), House subcommittee chairman.

Aircraft position and advisory information is passed between the controllers on paper or is

“How do you update a system that continuously is being upgraded?”

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written with grease pencil on Plexiglas, known as flight strips. So far, IBM and the FAA have not been able to determine an electronic equivalent of a flight strip.

"How do you update a system that continuously is being upgraded? How do you keep all the processors in sync in a distributed process?" Ebker asked. "I don't know the answer and [neither do] my engineers."

The GAO report questioned ISSS' stability, noting that the AAS contract requires ISSS to sustain 210 common consoles operating at peak load. "IBM has only been able to reach a level in which

56 common consoles work together for any significant length of time," the report stated.

Ebker also acknowledged that IBM has not been able to suitably test the million lines of Ada code it has written for ISSS due to inadequate testing tools. Joseph Del Balzo, FAA acting administrator, said the agency has asked TRW, Inc. to review the Ada code IBM has written for ISSS and report back to the FAA in a month.

Del Balzo said the agency — which has gone through eight administrative chiefs in nine years and has changed direction on AAS and its own air traffic center consolidation plans several times — accepted blame for many of the AAS problems and will submit firm requirements to IBM by April 1. "We need to separate the nice to haves from the need to haves," he said.

The ISSS came under sharp attack last week by the air traffic controllers who will be using it. John Thornton, senior director of legislative affairs for the National Air Traffic Controllers Association, called ISSS unnecessarily complex. Checking an aircraft's projected position can be done with the turn of a knob today, he said, but with ISSS, a controller would have to hit 16 keystrokes.

But in spite of the difficulties plaguing AAS, nobody wants IBM or the FAA to stop work on it.

Representatives from the National Business Aircraft Association, the Professional Airways Systems Specialists and the Air Transport Association said it would be a mistake to cancel AAS and start again from scratch. ■

Firms ready enhanced SNMP wares

By Maureen Molloy
Senior Editor

WASHINGTON, D.C. — The two key providers of SNMP software last week announced they will begin shipping a greatly enhanced version of the protocol that, after months of delay, is expected to be ratified by the IETF as a full standard by the end of the month.

Epilogue Technology Corp. and SNMP Research, Inc. separately said they have upgraded their Simple Network Management Protocol products to support SNMP Version 2 — the latest and greatest version of the Internet Engineering Task Force's (IETF) standard net management protocol. The Epilogue and SNMP Research software is used by other vendors to develop management platforms and agents.

SNMPv2 overcomes many limitations of the current SNMP version and is a technically more elegant and complete protocol. Unlike its predecessor, which only supports devices, SNMPv2 will let users manage applications on hosts and personal computers. In addition, it will provide security in the areas of authenti-

cation, authorization, access control and privacy.

That's a key enhancement because, without security, many vendors and users have been reluctant to employ SNMP for controlling net devices. Instead, they have used it simply for monitoring purposes.

Another key refinement is expanded network protocol support. The Transmission Control Protocol/Internet Protocol-centric aspects of SNMPv1 were removed so that SNMPv2 can work over Apple Computer, Inc. AppleTalk, Novell, Inc. Internetwork Packet Exchange (IPX) and Open Systems Interconnection nets.

SNMPv2 will come equipped with a feature that allows efficient handling of bulk data transfers from managed elements, speeding the transfer rate of information and reducing the load on the network.

It also supports manager-to-manager interaction, which will enable two SNMPv2 management applications to communicate so that users can create hierarchies of management. The current SNMPv1 only offers manager-to-agent communications.

Epilogue said its new Envoy SNMPv2 software is in beta test and will be available early next month. The vendor said the majority of its OEM customers are expected to implement SNMPv2 in their products by year end.

SNMP Research said it now supports SNMPv2 in all of its

manager station and agent products and that all source code distributions will receive SNMPv1 and SNMPv2 agents.

Both vendors said their SNMPv2 products will be backward-compatible with the original SNMP standard so that SNMPv2 managers deployed in user sites can interoperate with existing SNMP agents.

Jeff Case, president of SNMP Research and one of SNMP's original authors, said the backward-compatibility will be achieved via a proxy agent that translates commands and messages. This bilingual management station option will respond to SNMPv1 packets with an SNMPv1 response and SNMPv2 packets with an SNMPv2 response, enabling users to preserve their investment in SNMPv1 as they move to SNMPv2.

One thorny issue remains, however, in the area of SNMPv2's security. SNMPv2's security relies on the Message Digest Algorithm 5 and calls for use of the Department of Defense's Data Encryption Standard to encrypt packets.

The problem lies in the latter standard, which can only be used in the U.S. The IETF will need to develop an alternative security specification for SNMPv2 to service users outside of the U.S.

Epilogue said that until such a specification is approved and adopted, it will ship two versions of SNMPv2 — one equipped with security and another without security for non-U.S. customers. ■

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Hughes Aircraft units join forces on ATM front

By Skip MacAskill
Staff Writer

WASHINGTON, D.C. — Hughes LAN Systems, Inc. (HLS) and Hughes Network Systems, Inc. (HNS) last week announced

a development agreement that will result in interoperable ATM products by first-quarter 1994.

The two Hughes Aircraft Co. subsidiaries, which are working together for the first time, will develop a full line of Asynchronous Transfer Mode products that will initially include an ATM switch and hub interfaces.

"HNS has wide-area expertise, and we've focused on the LAN side, so with ATM being the first technology to seriously attempt to eliminate the lines between LANs and WANs, it only made sense for [us]

to work together," said Joe Kennedy, president and chief executive officer of HLS.

Under terms of the development plan, HNS will build an ATM switch with an aggregate capacity of between 2.5G and 10G bit/sec that will be targeted at the private wide-area network market.

The matrix-based switch will also interoperate with HNS' Strategy line of frame relay and X.25 network switches. The HNS switch will be able to support connections to a wide variety of devices, including multi-protocol routers, video servers and private branch exchanges, as well as a number of

wide-area services such as frame relay.

It will also support ATM connections over the 45M bit/sec DS3 rate and 155M bit/sec Synchronous Optical Network Optical Carrier-3 speed. Both redundant and nonredundant configurations will be offered.

HLS will develop ATM switching modules for its Enterprise Hub line that will have the ability to interconnect with the HNS switch. The modules will support four to 16 ports each and have separate switching engines with a capacity of 2.5G bit/sec.

More product details and pricing will be announced by the companies before year end, with rollouts tentatively scheduled for the first quarter of 1994. □

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MCI, SunConnect team up on mgmt.

continued from page 6
nouncement here.

HyperScope software residing at MCI network management centers collects data from SNMP agents on MCI switches and feeds customized data to users via HyperScope software residing on their SunNet Manager workstations. Management Information Base 2 extensions written by MCI tell SunNet Manager how to interpret the data.

Software from SAS Institute, Inc. running on the SunNet Manager workstation presents HyperScope data in a graphical or textual format for manipulation purposes.

Denis Yaro, vice president and general manager of SunConnect, said the agreement is the company's first major move into the WAN arena. He said relationships with other carriers will likely be forthcoming but declined to comment further.

HyperScope is available from MCI for \$975 per month.

SNA connectivity

SunConnect also last week announced Solaris 2.1 versions of its entire line of SNA connectivity software, which previously ran on an earlier version of the SunSoft Solaris operating system. SunConnect executives highlighted other enhancements to two of those products — Versions 8.0 of its SunLink SNA 3270/RJE gateway and SunLink SNA Peer-to-Peer connectivity software, which lets users forge LU 6.2-based links to IBM machines.

The beefed up SunLink product line is part of SunConnect's effort to better enable workstations and mainframes to work together as users migrate more applications onto LANs.

The SunLink SNA 3270/RJE is 3270-emulation software designed to let Sun Microsystems, Inc. SPARCstations communicate with IBM and compatible mainframes. The new version lets a workstation emulate either a 3270 cluster controller or 3770 remote job entry station and supports not only token-ring, but also Ethernet and Fiber Distributed Data Interface LANs.

The SunLink SNA Peer-to-Peer offering has been upgraded to provide tighter integration between SunNet Manager and IBM's NetView net management system. It also now includes support for the Common Programming Interface for Communications, IBM's high-level application pro-

(continued on page 44)

DATA NET ARCHITECTURES

NETWORK ARCHITECTURES, DATA NETWORK EQUIPMENT, STANDARDS AND ENTERPRISE NETWORK MANAGEMENT

Worth Noting

“Some users want to be able to centrally control their large LAN environments as easily and simply as they have controlled their mainframe-based networks. That just isn't possible with today's tools.”

Lee Reiswig
President
Personal Software
Products Division
IBM
Somers, N.Y.

Data Packets

Netlink, Inc., which is based in Raleigh, N.C., last week added new management capabilities to Release 2.0 of its SDLC Link Server Synchronous Data Link Control-to-Logical Link Control conversion product.

The firm added a Simple Network Management Protocol agent that will let the box be managed by any industry-standard SNMP manager.

The SNMP agent not only lets users manage the Link Server itself, but also the SDLC devices attached to it.

Netlink also added Systems Network Architecture/SDLC Dial-In Network Management Support that lets remote SNA users dial into an IBM NetView mainframe through a Link Server rather than via a 3745 front-end processor.

The support lets remote users dial in and report configuration and performance information to NetView. It also can report the status of the dial-in SDLC lines.

The new management features will be added at no cost to Release 2.0, which is scheduled to ship in the second quarter. □

HP teams with Ellery to push DCE-compatible tools

Effort will ease development of DCE-based apps.

By Jim Duffy
Senior Editor

WASHINGTON, D.C. — Hewlett-Packard Co. and Ellery Systems, Inc. last week said they are combining their respective application development tools in an effort to help users more easily develop programs that are com-

velop DCE applications in a fraction of the time it would take using only a DCE tool kit, while HP's software provides DCE-compatible communications, security and directory services.

In addition to HP's Unix-based workstations and servers, Ellery's Open Systems software runs on Sun Microsystems, Inc. SPARCstations, Digital Equipment Corp. Ultrix and OpenVMS workstations and servers, and Microsoft Corp. Windows NT-based Intel Corp. and DEC Alpha systems. It cuts DCE application development time by alleviating remote procedure call programming and modification of an application's source code.

When combined with a DCE development environment such as HP's, users can build "large-scale distributed applications before the Ice Age," said Geoff Shaw, executive vice president at Ellery.

Usually, DCE applications take six to 12 months to write and involve about 700 lines of code, Shaw said. Ellery's software can (continued on page 12)

Users can build "large-scale distributed applications before the Ice Age," Shaw said.

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patible with the OSF's Distributed Computing Environment (DCE).

The two companies will jointly market HP's DCE Development Environment, which is based on the Open Software Foundation, Inc.'s DCE, with Ellery's Open Systems software. Ellery's product is said to enable users to de-

Jupiter tool provides LAN access for SDLC devices

By Bob Brown
Senior Editor

WALTHAM, Mass. — Jupiter Technology, Inc. has announced a product designed to give SDLC and asynchronous devices access to token ring-attached IBM mainframes.

Like products from Netlink, Inc. and Sync Research, Inc., Jupiter's Lan*Way converts Synchronous Data Link Control traffic for transmission across a token ring to an attached host. In addition, Lan*Way provides emulation services so asynchronously attached personal computers, VT-100 terminals and other devices can access hosts.

Lan*Way is one of the first off-the-shelf products from Jupiter, which sells mostly customized products through OEMs, integrators and resellers. It is also the first product introduced by the company since a group of inves-

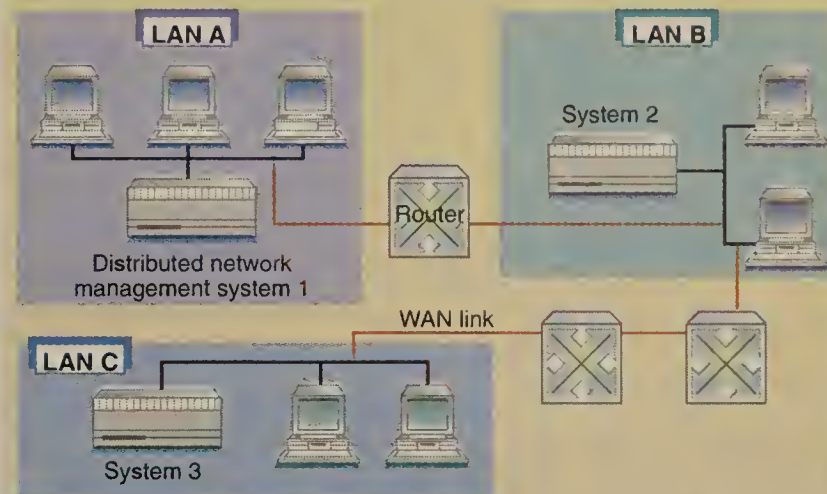
tors representing Jupiter managers and outside investors purchased it from Intel Corp. late last year, said Roger Walton, director of marketing.

Lan*Way is based on the company's basic hardware platform, the NPS 9600, which is powered by a Motorola, Inc. 68030 processor and Jupiter's proprietary Softlink operating system.

Lan*Way supports from three to 32 ports on the user side and one token-ring port. The device is configured with one, two or four processors, based on the number of ports required, and each processor supports as many as 64 concurrent sessions. Jupiter's higher end, customized products support up to eight parallel processors and eight local-area network connections, either token-ring or Ethernet.

Lan*Way can be managed as a (continued on page 12)

Distributed but central



With distributed network management, users can deploy independent systems to monitor and control each LAN separately. Yet any one system can act as a centralized manager by tapping into the others to get updates on overall internetwork status and performance.

GRAPHIC BY SUSAN SLATER

SOURCE: DAX ASSOCIATES, ORELAND, PA.

Easing the move to distributed mgmt.

Some hints on what to look for in a distributed net mgmt. system and how to put one to use.

By David Axner
Special to Network World

As global enterprise networks continue to spread like ivy, so do the problems in managing these environments. Management chores get even more difficult and time-consuming as LAN/WAN internetwork environments become more heterogeneous through business acquisitions or realignments.

Many users tasked with managing such heterogeneous, distributed internetwork environments are finding that traditional centralized network management schemes cannot do the job because they were designed for the homogeneous, hierarchical networks of yesteryear.

Recognizing that a centralized management scheme won't work well in an internetwork environment, several users are tapping distributed management systems made by such vendors as Digital Equipment Corp., Hewlett-Packard Co., IBM, Novell, Inc., Racal-Datcom, Inc. and SunConnect.

Users are also interested in the development of standard distributed management systems such as the Open Software Foundation, Inc.'s (OSF) Distributed Management Environment (DME). The DME will enable vendors to write distributed management applications. The OSF is expected to begin releasing its net management paradigm this year (see "A distributed mgmt. system

blueprint," page 35).

With so many varying architectures to choose from, figuring out what to look for in a distributed net management system can seem like a daunting task. But at a base level, distributed management architectures should support industry-standard management protocols, application program interfaces (API), gateways to other network management systems or network elements, tool kits for developing interfaces to proprietary management applications and an industry-standard graphical user interface (GUI).

Unlike conventional centralized network management systems that reside on a single host, distributed architectures are designed to be modular and consist of multiple management applications that can reside on computers located on different network segments.

Although applications are distributed across the network, the discrete software modules making up the applications can use network links to share management data as well as the processing power of each other's hardware to function as a single entity.

For example, users should be able to divide the management of large networks into workable segments, each managed independently from the others. Users (continued on page 12)

Characteristics of distributed network management systems

Vendor	Product	Client Interface	Server OS	Net mgmt. protocol	Interprocess communications	API	Database	Security	Gateway	Tool kits supported	Delivery date, planned availability
Digital Equipment Corp.	PolyCenter SNMP Manager	X Window System, OSF Motif	Ultrix, OSF/1 (future)	SNMP, NICE, DEC Extended LAN Management Software, MOP	Distributed SQL	SNMP, SQL	Ingres SQL	Password, access control	SNMP trap	None	April 1991, new version 1Q
Hewlett-Packard Co.	OpenView	OSF Motif, OpenView Windows	HP-UX, SunOS	SNMP, CMOT, CMIP	CMIP, DCE RPC, Windows API, SNMP API	XMP, CM-API	SQL interface, Ingres	HP-UX system-based, SNMP, CMIP	DEC, SNA, NetWare	API developers' kit	Dec. 1992
IBM	LAN NetView	OS/2 PM, OSF Motif	OS/2, DOS 5.0, MS-Windows	SNMP, CMOT, CMOL	CMIP	XMP, CM-API	Any SQL, OS/2 Extended Services Database Manager	Through other IBM products	NetView	None	2Q
Novell, Inc.	NetWare Management System	Windows, OS/2 PM	NetWare	SNMP, Novell protocols	Multiple SNMP management servers	Novell APIs	Novell Btrieve with SQL interface	NetWare	SNMP, NetView	Network management	April 1992
Racal-Datcom, Inc.	Racal Management System	OSF Motif, Windows, OS/2 PM	OS/2, DOS, Windows, SunOS	SNMP, CMIP, RPC	Short stack CMI derivative	Proprietary, CM-API (future)	ISAM interface, SQL (future)	Future application	SNMP, NetView, CMIP (future)	API developers' kit	July 1991, Release 3 Oct. 1992
SunConnect	SunNet Manager	X Window System, OpenLook/Open Windows	Solaris	SNMP, Sun RPC, CMIP Proxy (June)	Sun Open Network Computing	Sun APIs	NetISAM interface to SQL via third party	Secure Solaris	NetView, NICE, CMIP (June)	Sun APIs	Jan. 1990, Release 5.0 2Q
API = Application program interface CM-API = Consolidated Management API CMIP = Common Management Information Protocol CMOL = CMIP over Logical Link Control CMOT = CMIP over TCP/IP DCE = Distributed Computing Environment ISAM = Indexed Sequential Access Method MOP = Maintenance Operation Protocol OSF = Open Software Foundation, Inc. PM = Presentation Manager RPC = Remote procedure call XMP = X/Open Management Protocol											

SOURCE: DAX ASSOCIATES, ORELAND, PA.

Easing move to distributed mgmt.

continued from page 11
may also want to monitor the entire network or individual segments from a single location or control all network segments when necessary (see graphic, page 11).

Another attribute a distributed management system should have is the ability to run on several different platforms, giving users the flexibility of running the management system on existing hardware and software. Racal-Dat-

com's Racal Management System (RMS) offers an example of this concept. It can run on different platforms under DOS, OS/2, Microsoft Corp. Windows or in a Unix environment under Sun Microsystems, Inc.'s SunOS.

The ability to run on different platforms was a motivating force in the Securities Industry Automation Corp.'s (SIAC) selection of HP's OpenView, says Dror Segal, director of network management and technologies. SIAC deployed OpenView on low- and high-end platforms based on application requirements.

OpenView is supported on a range of HP 9000 and 3000 platforms, IBM RISC 6000 workstations and Windows-based personal computers.

On top of supporting an array of hardware platforms, distributed management architectures give users flexibility in how management applications are deployed. Existing centralized applications can be rewritten for the distributed environment and deployed at one or more locations on an as-needed basis. Likewise, new management applications can be developed and deployed anywhere on the network.

Standard protocols

Users examining a distributed management architecture should look first to see what type of management protocols it uses to interconnect and interoperate with network devices and management applications from multiple vendors.

The most popular standard management protocols are Simple Network Management Protocol and the Common Management Information Protocol (CMIP). These industry-standard protocols let management applications retrieve management data from network devices as well as return commands needed to get the device working properly.

SNMP is implemented by most internetworking vendors, largely because it was developed to manage the Internet. CMIP, on the other hand, is a part of the OSI protocol stack, which has not yet achieved the acceptance that was anticipated and is primarily used by U.S. government agencies.

Therefore, the leading vendors of distributed management systems all support SNMP. HP's OpenView and IBM's LAN NetView have also implemented a version of CMIP that runs over Transmission Control Protocol/Internet Protocol networks.

CMIP over TCP/IP (CMOT) gives users the expanded functionality that CMIP offers over SNMP (see chart, this page).

CMIP is supported by DEC on its DEC Management Control Center (DECmcc) but not on its Polycenter SNMP Manager, which is targeted to the management of network devices using SNMP agents. Besides supporting SNMP as a management protocol, both Novell's NetWare Management System and Sun's SunNet Manager support their own proprietary management protocols.

Racal-Datcom plans to implement CMIP and CMIP over Logical Link Control (CMOL) on its RMS as its customers demand. SNMP management applications and their corresponding Management Information Bases (MIB) reside on network servers. Network devices controlled and managed by the management applications contain software called management agents. These agents respond to commands issued by the management application and, through alarms, alert the management application to conditions that exceed user-established thresholds. Most vendors of network elements, including bridges, routers and hubs, now provide SNMP agents on their products.

Standard APIs

Another key capability to look for in a distributed network management tool is the number of standard APIs it supports. The use of standard APIs enables network management applications developed by distributed management system vendors to interoperate with management applications from other vendors, as well as with user-written applications that employ the same APIs.

This is an important consideration for users who may want to add management applications produced by third-party vendors

to supplement existing system applications or to satisfy needs not supported by the management system vendor.

One such standard API is the X/Open Company, Ltd.'s X/Open Management Protocol (XMP), which is based on the Consolidated Management API (CM-API) specification jointly authored by HP, Groupe Bull SA and IBM and was adopted by OSF for its DME. XMP provides a way for management applications to access the services of SNMP and CMOT.

The XMP API is currently supported by HP's OpenView and IBM's LAN NetView distributed management systems. Racal-Datcom plans to provide support for the CM-API on its RMS when applications written for the API become generally available. Novell and Sun each use their own proprietary API.

Another standard distributed network management systems should support is SQL, which enables management applications to access and retrieve data from a management database. SQL is supported by leading relational database management systems that are either supplied with a distributed management system or designed to work with one.

Ingres Corp.'s Ingres is the relational database provided by DEC's Polycenter SNMP Manager and by HP's OpenView. IBM supports any SQL relational database for LAN NetView, but offers its own OS/2 Extended Services Database Manager. Novell provides an SQL interface for its Btrieve, which is part of NetWare. Racal-Datcom currently has an ISAM interface, but plans to have an SQL interface for relational database support in the near future. Sun provides an ISAM interface to SQL through a Sun partner to accommodate the user's choice of database.

(continued on page 33)

Tool provides LAN access

continued from page 11
PU 2 device via Simple Network Management Protocol management systems or IBM's NetView network management system, Walton said.

Lan*Way, which also features a hard disk drive for software storage and updating, will be

available in the second quarter, with pricing for a three-port system starting at \$4,500.

Lan*Way plans to roll out other off-the-shelf products in coming months, Walton said.

Areas being targeted are Transmission Control Protocol/Internet Protocol-to-Systems Network Architecture network connectivity and frame relay support, he said. □

HP, Ellery team to push tools

continued from page 11
cut that development time down to three weeks and 56 lines of code, he said.

Ellery's Open Systems software includes a variation of the C programming language that allows developers to use familiar programming resources to build distributed applications.

The University of New Hampshire and Oregon State University used the HP-Ellery tools to build a distributed application that determines the deforestation rate of tropical rain forests.

The application, called the Earth Data System, allows users to share 500G bytes of data stored on workstations and su-

percomputers linked by the National Science Foundation Network at T-3 rates. In November, the application will run over a nationwide 155M bit/sec Asynchronous Transfer Mode network supplied by Sprint Corp., Shaw said.

Earth Data System allows scientists to browse, analyze and work with data "as if it's in the same room, on the same terminal," Shaw said.

Mark Abbot, professor of oceanography at Oregon State University, concurred. "It brings together distributed experts that [used to] call on the telephone, use electronic mail or fax machines. It creates a virtual laboratory."

The HP-Ellery software tools are available now at a cost of \$9,900. □

LOCAL NETWORKING

LAN HARDWARE, NETWORK OPERATING SYSTEMS AND LAN MANAGEMENT

Worth Noting

“Novell’s not in the application business; Novell’s in the glue business.”

John Edwards
Vice president
Desktop Systems Group
Novell, Inc.
Provo, Utah

Netnotes

Cayman Systems, Inc. last week announced the release of new software for its GatorLink multiport AppleTalk Remote Access Protocol server for Ethernet local-area networks. The GatorLink product provides Apple Computer, Inc. PowerBook and Macintosh users dial-in access to an EtherTalk network, enabling remote users to access all network resources available to local nodes.

The GatorLink System 1.1 adds features such as dial-back and the ability for administrators to set connection time limits and shield remote users from network broadcasts, thus improving performance on larger nets.

GatorLink System 1.1 is available now as an upgrade for \$99.

Pacific Data Products, Inc., based in San Diego, last week announced its entry in the networking market with Pacific DirectNet, a print server Ethernet card designed to give users on Novell, Inc. NetWare and Transmission Control Protocol/Internet Protocol networks simultaneous access to Hewlett-Packard Co. LaserJet printers.

The card, which fits into the I/O slot on HP LaserJets, offers an alternative to two separate LaserJet cards from HP — one for NetWare and one for Unix networks.

The DirectNet card features flash read-only memory for software upgrades and features

(continued on page 14)

Novell adds NetWare NFS Gateway to its Unix line

Pack enables users to access files on remote Unix.

By Caryn Gillooly
Senior Editor

WASHINGTON, D.C. — Novell, Inc. last week added to its family of Unix connectivity products with NetWare NFS Gateway 1.1, software that lets users access Network File System (NFS) file services on remote Unix sys-

tems as if they were on local NetWare servers. for NetWare 4.0 is under development, according to Novell. The NLMs let DOS and Microsoft Corp. Windows users on the NetWare local-area network view and access files on remote Unix machines as if they were resident on the local NetWare server.

Novell already offers a family of Unix connectivity products, including NetWare NFS and LAN WorkGroup, both of which provide server-based connectivity between NetWare and Unix. Another product, the LAN WorkPlace, is basically a Transmission Control Protocol/Internet Protocol stack loaded on a user’s machine.

These existing products, however, require the user to be familiar with the Unix environment. This is not the case with the new NFS gateway.

“The product breaks down the technology barriers between the NetWare and Unix environments, [letting] people familiar with NetWare access NFS files in the very

(continued on page 14)

Firm unveils mini adapter for notebook

By Fredric Paul
Senior Editor

SAN JOSE, Calif. — Asante Technologies, Inc. this week will announce Mini EN/SC, the smallest Small Computer Systems Interface (SCSI) Ethernet adapter on the market for Apple Computer, Inc. PowerBook notebook computers.

Craig Johnson, Asante’s director of product marketing, said Mini EN/SC is designed to enable mobile PowerBook users to carry the unit with them and then easily connect to the network when re-entering their offices or when stopping at other offices on the road.

Mini EN/SC is also suitable for Ethernet access from “closed” desktop Macintosh computers, such as the Macintosh Classic, that have no expansion ports.

Little bigger than a cassette-

tape box (4.3in. by 2.75in. by 1in.), Mini EN/SC weighs about 12 ounces. Competing adapters weigh anywhere from 13 to 25 ounces, Johnson said, and take up three-to-five times as much space.

Like competing products, the Asante adapter requires an AC adapter box, which nearly doubles the weight and bulk of the entire system.

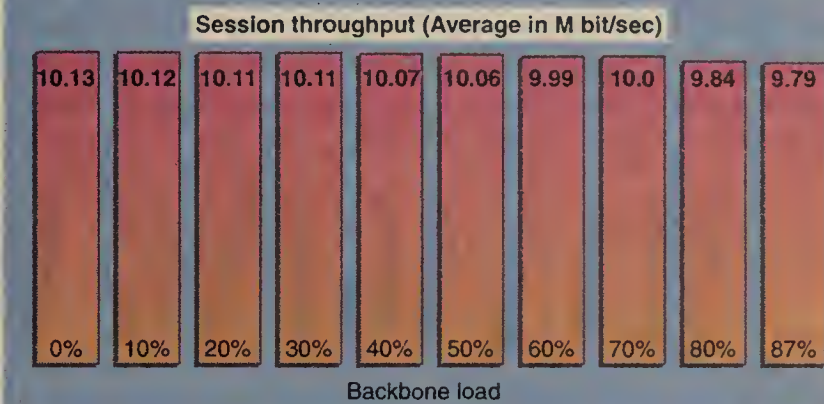
Mini EN/SC supports both thin and 10Base-T Ethernet connections via autosensing ports so users do not have to set jumpers or switches. According to Asante, competing units support only one media each.

Mini EN/SC and EN/SC-10T come with external switches to terminate and set SCSI identification, letting users configure the adapters for integration with other SCSI devices. A selection of LEDs indicates termination, link integrity, link disable, power and network activity.

Both of the new Mini adapters are scheduled to ship this month. Mini EN/SC carries a list price of \$459, while Mini EN/SC-10T — which supports only 10BaseT connections — costs \$399. ■

FDDI: the autobahn of LAN backbones

InterLab’s test examined the effect of backbone load on session throughput and showed FDDI can effectively support high-bandwidth applications, even when the net is heavily loaded with other traffic.



FDDI passes tests with flying colors

Trial examines its reliability, support for source routing traffic and bandwidth-intensive apps.

By Maureen Molloy
Senior Editor

SEA GIRT, N.J. — An in-depth trial of Fiber Distributed Data Interface technology has provided some hard evidence that an FDDI backbone sustains the throughput needed for bandwidth-intensive applications, is highly resilient and can seamlessly support source routing traffic from token-ring attached LANs.

The Applied FDDI Technology Trial was performed during the past several months under the aegis of Kevin Tolly, president of InterLAB, an independent network testing firm and consultancy. It was initiated to give users data about FDDI’s performance in a multivendor net environment.

Until now, users have had little data to help justify the move to FDDI, Tolly said. To rectify that, InterLAB built and operated a 100M bit/sec FDDI-based internet in its testing facilities here that simulates a corporate net and includes products such as bridges, routers, network interface cards, concentrators, intelligent hubs and network analyzers.

FDDI equipment was provided by Ascom Timeplex, Inc., Crescendo Communications, Inc., Digital Equipment Corp., E.I. du Pont de Nemours & Co., Fibernet Research, Inc., Fibronics International, Inc., Hewlett-Packard Co., Interphase Corp., Madge Networks, Inc., National Semiconductor Corp., Network Systems Corp., Proteon, Inc., 3Com Corp. and Wandel & Goltermann Tech-

nologies, Inc. (“Firms team up for trial to prove viability of FDDI nets,” NW, Dec. 7, 1992).

Three scenarios

So far, Tolly’s group has tested FDDI in three scenarios, including how well it supports high-performance applications, how well FDDI supports source routing traffic and how reliable the technology is.

Until now, users have had little data to help justify the move to FDDI, Tolly said.

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The first case study examined FDDI’s performance as a backbone network by measuring the amount of traffic an FDDI backbone actually supports. In addition, the laboratory tested how well the FDDI net supported bandwidth-intensive applications when increasingly heavy loads of other traffic were placed on the backbone, simulating an environment where multiple token-ring or Ethernet local-area network segments would be passing traffic across the backbone.

An IBM LU 6.2 application was used for the tests so researchers

(continued on page 21)

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This seemed to be a key requirement. "We do a significant amount of mathematical modeling and imaging on our high-performance supercomputers and Unix workstations, but we also need to access this data from our desktop PCs," said Bruce Marler, technology assessor and

The NetWare NFS Gateway will be available early next month in versions for 5, 10, 20, 50, 100 and 250 users priced at \$1,500, \$2,495, \$3,495, \$4,995, \$6,995 and \$12,495, respectively. 

continued from page 13

According to the company, which is a unit of Digital Communications Associates, Inc. in Alpharetta, Ga., future products will include support for token ring, LAN Manager, AppleTalk and Windows NT,

Madge, based in San Jose, Calif., will begin shipping the Smart 16/4 Pocket Ring-note next month for \$895.

The company said the new products will be available as soon as the IEEE 802.3 Committee sets protocol standards for Fast Ethernet, which is most likely to occur later this year.

The first versions will ship in April, with pricing starting at \$1,150. Additional versions to support unshielded twisted-pair cabling will be available in the third quarter.

Users dial into an Ethernet network using a standard modem, and NetModem/E lets them take advantage of all Windows for Workgroups resources as if they were connected locally. NetModem/E includes a built-in 14,400 bit/sec modem that uses V.32 and V.42 standards to support up to 57,600 bit/sec throughput. It connects to the network using thin, thick or 10Base-T Ethernet cabling. The NetModem/E for Windows for Workgroups is available now for \$1,699. 



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INTERNETWORKS

LAN-TO-LAN AND LAN-TO-WAN EQUIPMENT AND STRATEGIES

Worth Noting

“Now that SynOptics [Communications, Inc.] has rolled out its [Asynchronous Transfer Mode] switch, the bigger task of educating users on how to deploy it from an application viewpoint becomes the top priority.”

Charlie Robbins
Director of
communications research
Aberdeen Group, Inc.
Boston

Link Notes

Andrew Corp. has announced a Simple Network Management Protocol agent for its local token-ring bridges that supports the standard Management Information Base (MIB) II specifications as well as Andrew's private MIB extensions. The software upgrade costs \$400 and is available now.

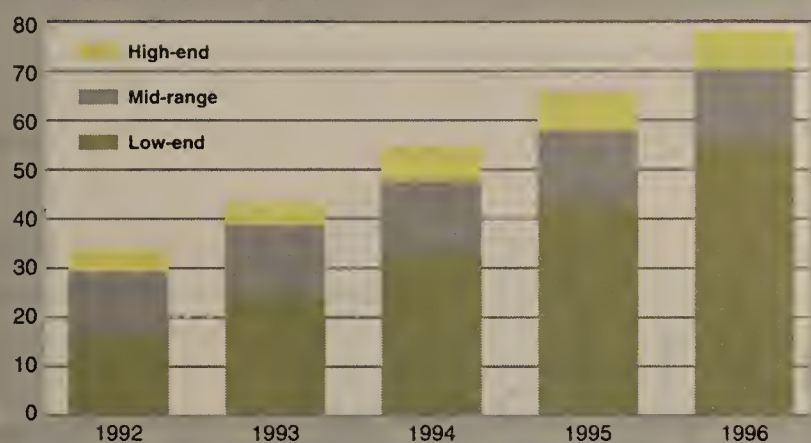
NCR Corp. has rolled out the StarLAN SmartHub FB, an eight-port 10Base-FL Ethernet hub that supports seven Fiber Optic Inter-Repeater Link connections and a single 10Base-T port. The SmartHub FB can support end devices as far away as 2 km and can be controlled by any Simple Network Management Protocol-based net management system. Available in April, the SmartHub FB costs \$3,695.

Cameo Communications, Inc. has upgraded the security features of its Ultra-Hub 5000 intelligent hub with a suite of new products, including a 12-port 10Base-T Ethernet module that checks

(continued on page 16)

Router vendors brace for branch office explosion

▼ Thousands of units sold



Having successfully penetrated corporate headquarters and major regional sites, router vendors are expected to see a surge in sales for remote sites.

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: DATAQUEST, SAN JOSE, CALIF.

Hughes LAN ups reliability, connectivity options on hub

Offers new release of network mgmt. software.

By Skip MacAskill
Staff Writer

WASHINGTON, D.C. — Hughes LAN Systems, Inc. last week announced new reliability and host connectivity features for its intelligent hub as well as a new version of its net management software that works with the major enterprise management platforms.

The company has bolstered

If one power supply fails, the second will kick in so the hub can continue to function.

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the redundancy of the five-slot version of its Enterprise Hub through a number of new features announced at INTEROP 93 Spring here, including dual power supplies that balance the power load required by the hub.

If one power supply fails, the second will automatically kick in so the hub can continue to function without interruption, thereby eliminating potential data loss. Distributing the work load between them also helps to extend the life of each power supply.

Available now, the five-slot Enterprise Hub with dual power

supplies is priced between \$2,495 and \$3,395, depending on configuration.

A new redundant cabling feature allows users to create redundant links on a per-port basis for the hub's Ethernet modules. Already available for the company's token-ring modules, the new feature lets users provide a secondary link for critical network devices, such as servers, with switchover to the secondary connection occurring automatically when the primary link fails.

Hughes also added a flash erasable programmable read-only memory capability to its terminal server hub module, which allows the module to store operating software and eliminates the need to download software after a power failure. Available now, the software upgrade costs \$400.

The company further enhanced the terminal server module with support for the TN3270 and LocalNet V2 protocols, which provide users with connectivity to IBM and asynchronous hosts. Supporting TN3270 enables asynchronous terminal users to run simultaneous sessions with multiple hosts and switch between sessions as needed, eliminating the expense of external gateways or multiple terminals for each user.

LocalNet V2, Hughes' own broadband protocol, provides connectivity to hub-based multiprotocol networks for asynchronous terminals on coaxial cable

(continued on page 16)

Cisco undercuts its FDDI router rivals

Industry's lowest priced FDDI router lets users cost-effectively link remote sites to FDDI backbone

By Maureen Molloy
Senior Editor

MENLO PARK, Calif. — Cisco Systems, Inc. announced last week the industry's lowest priced FDDI router with the introduction of an FDDI interface for its 4000 mid-range router, enabling users to cost-effectively extend the reach of Fiber Distributed Data Interface to small work group LANs.

The Cisco 4000 router chassis, equipped with the new FDDI module, is priced starting at \$12,900 — more than \$5,000 less than some competing routers. According to Tony Moraros, Cisco's product manager, the router is designed to let users affordably tie smaller local-area networks at branch sites into an FDDI corporate backbone.

The four-slot router can be configured with the new FDDI Network Processor Module and any combination of two Ethernet, token-ring and serial interfaces up to T-1 speed. The module is for the 4000 router only, however,

and cannot be used in Cisco's high-end AGS+ or new 7000 Internetwork Router.

The FDDI Network Processor Module supports multimode fiber at distances of up to 2 km between stations and supports the

The Cisco 4000 router chassis is priced more than \$5,000 less than some competing routers

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full set of FDDI fault-tolerant and redundancy features, including dual attachment to maintain uptime if a station or cable plan malfunctions. It also offers dual homing for redundancy in concentrator environments and an optical bypass switch that pre

(continued on page 16)

Xyplex announces FDDI bridge and stackable hub

By Maureen Molloy
Senior Editor

BOXBOROUGH, Mass. — Xyplex, Inc. used last week's INTEROP 93 Spring here to introduce an FDDI-to-Ethernet bridge and a stackable 10Base-T hub.

The 3310 FDDI-to-Ethernet Bridge, equipped with an Ethernet port and a Fiber Distributed Data Interface port, is aimed at users wanting to link a single Ethernet to a corporate FDDI backbone.

The bridge supports full filtering capabilities on both interfaces — 460,000 packet/sec for FDDI and 14,880 packet/sec for Ethernet — and can be managed from any Simple Network Management Protocol-based net management station. Available now, the 3310 costs \$9,995.

By the end of the year, Xyplex said it will deliver an FDDI-to-

Ethernet router module for its Network 9000 Intranetworking Hub that will provide routing for as many as three internal Ethernet segments to a single or dual attached FDDI backbone.

The three-port router module will have an aggregate packet forwarding speed of 20,000 packet/sec and will support all of the major protocols, including the Transmission Control Protocol/Internet Protocol, Novell Inc.'s Internetwork Packet Exchange (IPX), Digital Equipment Corp.'s DECnet and Apple Computer, Inc.'s AppleTalk.

Pricing has not yet been set but it will cost under \$15,000.

Xyplex also said last week the 3110 10Base-T Concentrator is aimed at linking small work groups of personal computers, workstations and file servers to a

(continued on page 16)

Hughes LAN ups hub connectivity options

continued from page 15

nets while retaining connections to installed hosts.

TN3270 and LocalNet V2 software will be included with all new shipments of the terminal server module, which is available now for \$3,695. A software upgrade for existing terminal server module users is also available.

In conjunction with the hub announcements, Hughes also rolled out Release 5.1

of its Simple Network Management Protocol-based Monet net management software package, which now features integration with SunConnect's SunNet Manager, Hewlett-Packard Co.'s OpenView and IBM's NetView/6000.

In addition, the company announced a multiuser access feature for Monet that allows as many as 15 net administrators to concurrently access Monet from workstations located anywhere on the network.

Available now, Monet 5.1 costs \$14,995. Existing Monet users can receive a free upgrade. 

Xyplex announces FDDI bridge and hub

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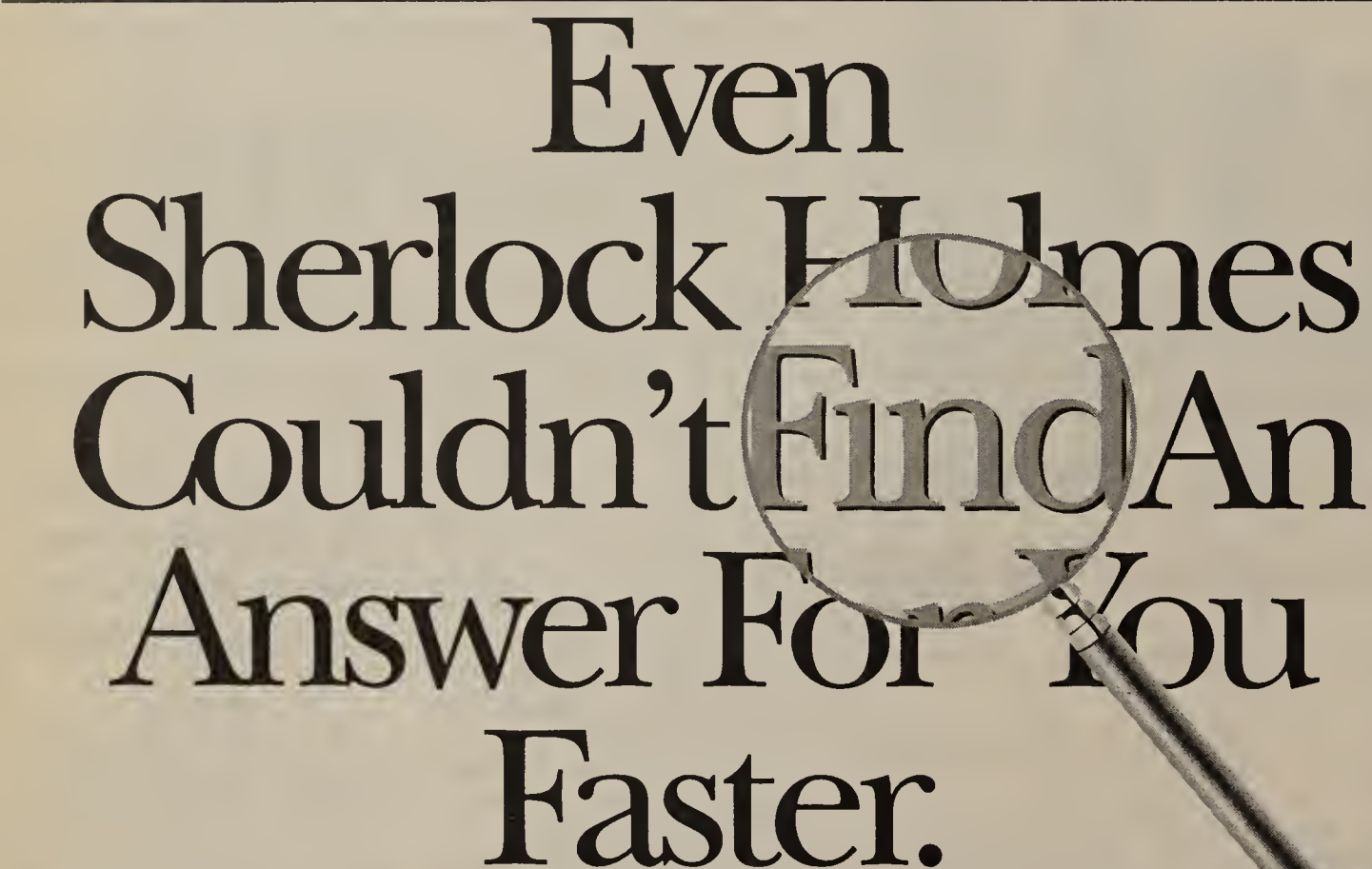
corporate internet. The hub is equipped with 12 RJ-45 ports for linking devices via twisted-pair wiring, and two 15-pin attachment unit interface connectors. It is also outfitted with a BNC ThinWire connector for attachment to an Ethernet backbone or to daisy-chain multiple 3110 hubs in a rack-mountable configuration.

The 3110 is available immediately in managed and unmanaged versions. The

unmanaged version costs \$795, while the SNMP-managed version is priced at \$1,595. An upgrade is available as a logic board for \$1,000.

In a related matter, Xyplex also announced that its Network 9000 and MAX-server line of routers have received certification on a variety of frame relay public services, including those from CompuServe, Inc., Northern Telecom, Inc., Sprint Corp. and Witel. The vendor's routers were also certified on frame relay switches offered by Cascade Communications Corp. and StrataCom, Inc. 

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Cisco undercuts its FDDI router rivals

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vents ring segmentation caused by multiple station failures.

The 4000 FDDI router supports the same protocols as Cisco's exiting routers, including the Transmission Control Protocol/Internet Protocol, Digital Equipment Corp.'s DECnet, Novell, Inc.'s Internetwork Packet Exchange (IPX), Xerox Corp.'s Xerox Network Systems, Apple Computer, Inc.'s AppleTalk, Banyan Systems, Inc.'s VINES, Hewlett-Packard Co.'s Apollo Domain and Open Systems Interconnection protocols.

It will also support key bridging algorithms — including the Spanning Tree Algorithm, source routing and source routing transparent — as well as the Open Shortest Path First and Cisco's proprietary Interior Gateway Routing Protocol.

The FDDI router will be available next month and ranges in price from \$12,900 for a single FDDI and Ethernet configuration to \$16,900 for one FDDI and two token-ring modules.

A similar configuration on Proteon, Inc.'s CNX 500 router costs \$19,600 for a single FDDI and Ethernet, and \$23,700 for a single FDDI and two token rings. The same configuration on 3Com Corp.'s NET-Builder router costs \$17,370 for an FDDI and Ethernet, and \$22,235 for a single FDDI and two token rings. FDDI upgrades for existing Cisco 4000 users are available for \$7,900 for a single-attached module or \$9,100 for a dual-attached module. 

Link Notes

continued from page 15

the address of each port before data is sent. A chipset on the new LAN Security module forwards packets only to the specified node and garbles data for delivery to all others. Available now, the module costs \$1,900.

The company also added a network control feature to its UltraView net management software package that checks each packet to see if it has a legal media access control address. When UltraView discovers the illegal address, it automatically disables the port.

Similarly, the integrated bridge that connects Ethernet segments within the hub and the bridge module that connects segments to external devices will now check for a legal destination and source address in every packet. The network control and secure bridging features are available as free upgrades. 

GLOBAL SERVICES

DOMESTIC AND INTERNATIONAL VOICE/DATA SERVICES, ACCESS EQUIPMENT AND REGULATORY ISSUES

Worth Noting

Carriers and equipment vendors spent more than \$275 million in 1992 on Asynchronous Transfer Mode research and development efforts, including user education and surveys, according to The Yankee Group, a Boston consultancy.

Regulatory Update

AT&T recently filed a report card at the Federal Communications Commission outlining its progress in negotiations with foreign carriers aimed at bringing down international accounting rates. The FCC has opened a proceeding to see what, if anything, it can do to lower the roughly \$4 billion deficit the U.S. has in telecommunications.

Much of the blame has been placed on accounting rates, which are fees that foreign carriers charge to terminate calls from the U.S. on their networks. Former FCC Chairman Alfred Sikes said he believes that other countries price these termination charges as much as 50% over cost.

In an effort to encourage those carriers to set prices closer to their real cost, the FCC last year set target ranges for international accounting rates for various regions of the world.

Although AT&T has made progress, the report to the FCC shows AT&T and other U.S. carriers have a long way to go. Out of 31 countries in Europe, only three — the U.K., Sweden and the Netherlands — are expected to meet the FCC targets this year. In the Asia/Pacific region, only two out of 38 countries will likely hit the FCC goals this year. **■**

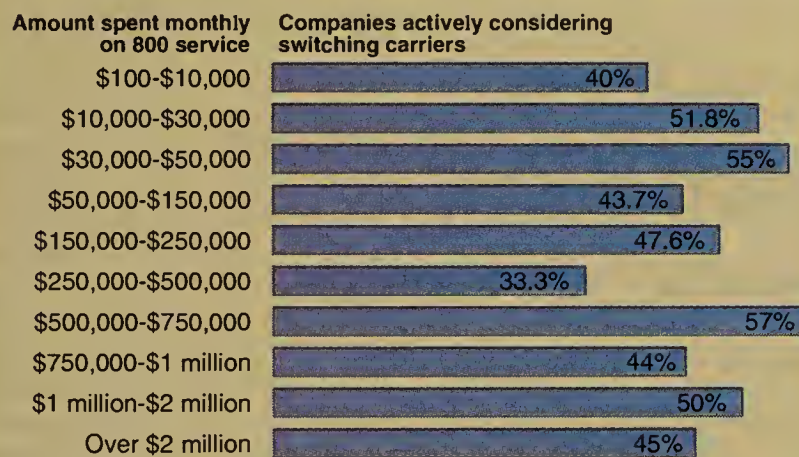
News from the 800 front

Figures are based on a survey of 3,000 users

46% of respondents — most of which use AT&T — are ready to move 800 traffic to another carrier.

Half of AT&T's Tariff 12 and Tariff 15 customers are actively considering switching carriers.

The bigger the customer, the more likely it is to switch carriers.



GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: STRATEGIC TELEMEDIA, NEW YORK

AT&T users set to jump ship as portability nears

Survey shows firm faces large loss of 800 share.

By Bob Wallace
Senior Editor

NEW YORK — AT&T stands to lose as much as 20% of its share of the 800 services market over the next three to five years, according to results of a 3,000-user survey released by Strategic TeleMedia, a research firm here.

Roughly 46% of the survey respondents, the large majority of which are AT&T 800 users, said they are ready to move 800 business to another carrier once 800 portability begins on May 1.

With 800 portability, toll-free services customers will, for the first time, be able to move from carrier to carrier at will while retaining their vanity 800 numbers.

The research firm said that the bigger the 800 customer, the higher the likelihood that the user will switch carriers. About 33% of customers that spend between \$250,000 and \$500,000 a month on 800 service are considering a move. Half of those spending between \$1 million and \$2 million are considering a change (see graphic, this page).

Worse still for AT&T, Strategic TeleMedia predicts that about half of the carrier's Tariff 12 and Tariff 15 customers indicated they are actively considering switching carriers. Almost a third of those currently give AT&T 90% of their 800 service.

But not everyone buys into the prediction that AT&T will lose

significant market share of the 800 industry.

"I think AT&T will be able to stem any losses of 800 customers," said Bryan Van Dussen, a senior analyst with The Yankee Group, a consulting and research firm in Boston. "They will be very aggressive in building on the quality and reliability of their services."

"I think AT&T will be able to stem any losses of 800 customers," said Van Dussen.

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AT&T agreed.

"We're confident that we've got the best 800 service at a competitive price," said Shawn Gilmore, 800 services marketing vice president with AT&T. "Customers will find that we offer the most in terms of service reliability, quality and innovation, and [they will] stay with AT&T."

That is a point AT&T has been trying to drive home in a massive 800 service marketing effort the past few months, a sign that the carrier is at least somewhat con-

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BT details int'l virtual private net service

Pending FCC approval, it will offer same features of large corporate private nets but at lower cost.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — BT North America, Inc. last week outlined plans here to roll out by year end a multinational virtual private network (VPN) service for voice, data, video and facsimile traffic that will replace large corporate private networks.

The carrier, whose parent company is the dominant telecommunications carrier in the U.K., asked the Federal Communications Commission for permission to set up the new network offering. BT wants to take advantage of a 1991 FCC ruling, which enables foreign carriers to place switches in the U.S. that collect switched or private-line traffic and transport that traffic via an international private line.

If BT receives permission from the FCC, it will be able to pick up a customer's switched, private-line or VPN traffic from any user site or local or long-dis-

tance carrier in the U.S. and transport it to a public net or a customer's private network in other countries. Les Hankinson, director of global programs at BT, said the carrier hopes to receive approval by year end.

With the new service, BT is targeting large corporate customers' private-line networks. The offering will give users the same level of features and functions users now have on their private nets at a fraction of the cost.

By owning the switch at both ends of the circuit, BT will be able to offer customers uniform dialing and routing features, as well as an integrated bill and volume discounts based on all traffic, Hankinson said.

Also, since BT will be the carrier on both ends of the service, the traffic is not subject to international accounting rates. Hankinson said this fact, as well as other operational efficiencies, will give

(continued on page 18)

Users frustrated by lack of new local carrier services

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — Users frequently encounter resistance when attempting to persuade local, regulated carriers to offer new network services according to two recently released user surveys.

While the studies — conducted by two independent research companies for the International Communications Association (ICA) and Southwestern Bell Corp. — came basically to that same conclusion, they sharply differ on the source of the problem. One survey indicates that regulators have not scrutinized local carriers' service plans closely enough, while the other says regulators are too involved for carriers to quickly roll out new services.

The ICA survey says carriers are not making spending choices based on sound business criteria.

"There's a major expenditure on infrastructure overall, but because the carriers don't do a business case analysis, users aren't getting the services they want," said Page Montgomery, senior vice president at Economics and Technology, Inc., a Boston-based consultancy that prepared the ICA study.

The ICA study indicates that local carriers often seek authority to invest money in technology to support services, such as information gateways or fiber local loops, without an adequate business plan in place to ensure they will recoup that investment. Another problem the study cites is local carriers' lack of skill in working with individual users to determine what investment should be made, as well as a failure to market and price services properly.

For the Southwestern Bell

(continued on page 18)

BT details int'l virtual private net service

continued from page 17

users a significant savings.

Although other carriers have attempted to strike deals with foreign carriers to offer more integrated international services, none have gone as far as BT's proposal, said Daniel Briere, president of TeleChoice, Inc., a consultancy in Montclair, N.J. For example, if a user wanted time-of-day routing for both 800 and VPN services, the user would have to use two separate

routing tables with other carriers, Briere said. However, with the integrated platform, users could do routing for both services with one table, he said.

BT is negotiating to place switches in Australia, Canada, France, Germany and the Netherlands in anticipation of extending the international service to those countries. There is currently little demand in Japan for VPN service because there is not a similar domestic offering there, Hankinson said. But if a market develops, BT will try to offer the service there, as well.

Hankinson predicted that multinational

al VPN arrangements will become increasingly common but that BT hopes to pull ahead of the pack and establish a leadership role.

ACC Global Corp. last year asked the FCC for permission to place a switch in the U.S. to offer international switched and private-line services. Fonorola, a Canadian reseller, has asked for permission to do likewise for service to Canada. Neither carrier has said it will offer a VPN service.

However, AT&T has opposed both of those requests. Before it will allow a foreign carrier to pick up switched traffic

from the U.S. for transmission over an international private line, the FCC requires the foreign carrier to prove that an equivalent opportunity exists in the companion country for U.S. carriers to do the same. AT&T claims that such equivalency does not exist in either Canada or the U.K.

The efforts of ACC Global and Fonorola may aid BT in rolling out its service because if the FCC determines that an equivalent opportunity exists in those countries for one carrier, it is virtually certain that other carriers can proceed without having to provide duplicate evidence. **■**

Patricia Seybold's

MARATHON WEEK

Patricia Seybold Group's

MARATHON WEEK

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AT&T users set to jump ship

continued from page 17

cerned about losing business. Sprint Corp. and MCI Communications Corp. likewise have been trying to woo new 800 users with large advertising campaigns.

Users know there's more to switching carriers than just placing a few calls.

Survey respondents said they are well aware that their carriers will have to cut-over to new signaling and database technologies in order to support 800 portability. More than 90% of the respondents said their telecommunications department's level of awareness is medium or high ("Nagging questions tarnish allure of 800 portability," *NW*, Nov. 30, 1992).

About 83% of the respondents said their primary carrier has discussed the topic with them, while 76% said they had attended some kind of briefing on 800 portability. Only 13% said they had formed an internal task force to deal with the issue.

The top concern about portability for 18% of users is that the move to Signaling System 7 will degrade service, which will likely mean a five- to seven-second post-dial delay. **■**

Users frustrated by lack of new services

continued from page 17

study, Strategic Policy Research, Inc. (SRP), a telecommunications research firm in Bethesda, Md., interviewed 10 of the carrier's major customers. SPR came to the conclusion that regulators are getting in the way of carriers rolling out new services.

"If carriers roll out a service in one place, they're under pressure from regulators to roll it out everywhere," said John Haring, a principal with SPR. That gives carriers a disincentive to meet customer needs.

Chip Shooshan, also a principal with SPR, said the study indicates that users want carriers to have more flexibility to deal on an individual basis with large end users, who do not need the protective veil of regulation. Because they are forced to offer service primarily through tariffs, regulated carriers are not competitive either in price or in timeliness of response, according to several users in the Southwestern Bell study.

Southwestern Bell, as well as the other regional Bell holding companies, has been pressing federal and local regulators to ease restrictions on the services they may offer and for greater pricing flexibility. **■**

ENTERPRISE APPLICATIONS

CLIENT/SERVER AND ENABLING SOFTWARE: DISTRIBUTED DATABASE, MESSAGING, GROUPWARE AND IMAGING

Worth Noting

“Computer-aided software engineering is making a comeback in the U.S. as users discover that they need a life cycle development methodology to build robust, enterprisewide client/server applications.”

Farzad Dibachi
Senior director of product marketing
Cooperative Development Environment
Oracle Corp.
Redwood Shores, Calif.

Store & Forward

Legato Systems, Inc. of Palo Alto, Calif., recently said it will incorporate Novell, Inc.'s LAN WorkPlace Transmission Control Protocol/Internet Protocol stack into its Legato NetWorker ClientPak II data storage utility. This will enable DOS users on a Novell NetWare local-area network to back up DOS and Unix-based applications onto a Unix or NetWare server supporting TCP/IP.

Available now, NetWorker ClientPak II costs \$1,500.

The **Data Interchange Standards Association** (DISA) will hold the EDI '93 Conference and Exhibit April 14-16 in San Antonio, Texas. DISA is the secretariat for ANSI's Accredited Standards Committee X12, which develops standards for electronic data interchange.

The conference will feature more than 70 educational sessions and about 50 exhibitors. The show costs \$635 for X12 committee members and \$735 for nonmembers. Call (703) 548-7005 for more information. ■

HICAM ready to introduce software-only E-mail utility

Directory synchronization offering to run on Unix.

By **Wayne Eckerson**
Senior Editor

SANTA CLARA, Calif. — After more than a year of planning and analysis, Hitachi Computer Products, Inc. (HICAM) last week announced it will roll out a software-only E-mail directory synchronization product.

Due out by the third quarter, the directory synchronization software will support all local-area network electronic mail systems and standards, and will run on a Unix platform. Most multi-vendor, multiplatform directory synchronization software comes bundled within message switch products, such as those offered by Soft-Switch, Inc.

While refusing to provide many product specifics, officials at the firm's Network Products Group said parent company Hitachi, Ltd., a \$62 billion Japanese electronics giant, is committed to making significant inroads into the area of network-based computing.

HICAM currently develops mainframe-based subsystems, such as disk and tape drives, and

the Network Products Group manufactures front-end processors for sale to Japan.

“Hitachi recognizes the shift from mainframe to network-based products and wants to make a significant commitment to PC LAN technology,” said Fred Stein, network software marketing manager at HICAM, based here.

Stein said the Network Products Group presented seven business plans to officials at the parent company, each outlining a product Hitachi could launch in the network computing market.

“We chose directory synchronization because there are no software-only directory synchronization products available and the LAN E-mail market is growing exceptionally fast,” Stein said.

HICAM is investing \$15 million and devoting 25 to 30 developers to produce the E-mail utility, Stein said. The Network Products Group did not have to hire many outside developers because it already had staffers with expertise in Unix, networking software and E-mail, he added. ■

Parallax runs high-quality video over ATM in demo

By **Joanne Cummings**
Senior Writer

WASHINGTON, D.C. — Parallax Graphics, Inc. last week demonstrated prototype software that enables Unix users to capture and display high-quality digital video feeds across an Asynchronous Transfer Mode (ATM) network.

The application, called RTVnet, is one of the first designed to take advantage of the high-bandwidth capabilities of ATM networks, the company said.

“ATM is exciting in theory, but everyone is concerned that it won't be real until the applications are out there to exploit it,” said Joe Kennedy, president and chief executive officer of Hughes LAN Systems, Inc., which used the demonstration at INTEROP 93 Spring here to showcase the capabilities of its ATM-based Enterprise Hub. “By delivering high-

performance video to the desktop with an application designed specifically for ATM, we're one step closer to commercial availability.”

RTVnet is designed for users that need to distribute high-quality video feeds, such as CNN news broadcasts, to local-area network users in real time, Parallax said.

In addition to Hughes, Parallax demonstrated the capability with Sun Microsystems, Inc., which provided the Unix workstations, and SynOptics Communications, Inc., which will be using the application separately to demonstrate its own ATM hubs.

John Ricketson, vice president at Santa Clara, Calif.-based Parallax, said the Hughes portion of the demonstration consisted of five Sun SPARC-10 workstations connected to three Hughes enterprise hubs via a fiber network.

(continued on page 20)

CA-Unicenter

Description: Provides a comprehensive set of integrated systems management tools for handling distributed, heterogeneous computing environments.

CA-Unicenter components:

- Security
- Scheduling
- Console automation
- Chargeback and accounting
- Performance monitoring
- Report distribution
- Archiving and backup
- Tape management
- Spooling

Number of prerelease users: 100

Platforms supported:

- Available 2Q: Hewlett-Packard Co.'s HP-UX
- In beta 2Q: Sequent Computer Systems, Inc.'s Unix and IBM's OS/2
- In beta by year end: Tandem Computers, Inc.'s Guardian, Pyramid Technology Corp.'s Unix, Sun Microsystems, Inc.'s Solaris 2.0, Data General Corp.'s DG-UX, IBM's AIX, NCR Corp.'s System 3000 and Novell, Inc.'s NetWare 4.0.

Pricing:

By number of users or Unix processing power.
Average acquisition price: \$36,000.

SOURCE: COMPUTER ASSOCIATES INTERNATIONAL, INC., ISLANDIA, N.Y.

CA sure bet in race for distributed mgmt.

Company first out of the gate with CA-Unicenter mgmt. tool for distributed computing environments.

By **Wayne Eckerson**
Senior Editor

ISLANDIA, N.Y. — It is a common complaint among users downsizing applications from mainframes to client/server platforms that there is a lack of integrated tools for managing and administering distributed computing environments.

While a bevy of vendors have announced intentions to provide integrated systems management for client/server computing environments, only Computer Associates International, Inc. (CA) is ready to market a legitimate product.

Next quarter, CA will release for general availability CA-Unicenter for Unix, systems management software for Hewlett-Packard Co. 9000 Series Unix processors running HP-UX. More than 100 customers that were enrolled in the software vendor's early support program have already deployed CA-Unicenter in production environments, according to CA officials.

“[CA] has a significant head start,” said Ed Acly, director of software research at Technology Investment Strategies Corp. in Framingham, Mass.

Firms such as Boole & Babage, Inc., Candle Corp. of America and Legent Corp. plan to announce products by year end and will prove formidable competitors, Acly said.

However, these companies

will have to move quickly to catch CA, which, by year end, will be shipping or beta-testing CA-Unicenter on nine other platforms, including IBM's OS/2 and Novell, Inc.'s NetWare (see graphic, this page).

CA-Unicenter offers many of the same systems management capabilities, which have existed in mainframe environments for years. These functions, which are also available in CA's mainframe version of CA-Unicenter, include tape management, scheduling, report distribution and chargebacks.

All of the management tools are integrated, reducing the number of systems managers required to support distributed processing environments. For example, when a system job fails to run, CA-Unicenter will

automatically open a trouble ticket at the help desk and inform the end users that their work may be delayed. It also will automatically escalate notification to the appropriate support personnel until the problem is resolved.

This level of automation and integration has been critical to Brigham Young University (BYU), which has implemented CA-Unicenter to manage several Unix applications that used to run on its IBM mainframe.

CA-Unicenter's scheduling and work load management capabilities have enabled BYU to use

(continued on page 20)



Kurt Seibert

automatically open a trouble ticket at the help desk and inform the end users that their work may be delayed. It also will automatically escalate notification to the appropriate support personnel until the problem is resolved.

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CA-Unicenter's scheduling and work load management capabilities have enabled BYU to use

(continued on page 20)

CA sure bet in race for distributed mgmt.

continued from page 19

students working part-time to manage its Unix environment, according to Doug Walker, assistant director of financial computer support at BYU in Provo, Utah.

Moreover, CA-Unicenter has enabled BYU to address the security deficiencies of Unix that were of great concern to internal and external auditors, he said. Most notably, CA-Unicenter has enabled BYU to restrict superuser privileges, which lets administrators access all resources and change any management controls.

"We could have purchased tools piece-

pooling from another workstation and scheduling from a mainframe console, said Alan Paller, CA's director of open systems.

In 1994, users will be able to link CA-Unicenter software running on different platforms across IBM Systems Network Architecture or Transmission Control Protocol/Internet Protocol networks. All versions of CA-Unicenter will support a common communications interface, which will enable users to manage systems across multiple platforms and networks, according to Kurt Seibert, vice president of

strategic business alliances at CA.

This peer-to-peer communications capability, for example, will make it possible to propagate passwords across multiple Unix platforms so users only have to log on once in order to navigate through multi-vendor distributed systems, Seibert said.

Despite the integrated functionality of CA-Unicenter, Acly said some users may shun it as well as other integrated systems management packages because they are committed to an open systems approach that lets them integrate the best class of tools from different vendors. He added

that users upgrading local-area networks to distributed Unix platforms may want to continue using tools they have implemented, rather than relearn an entirely new set of tools.

According to Seibert, 60% of CA-Unicenter customers are upgrading LAN-based systems, rather than downsizing from mainframes.

"Surprisingly, the majority of our customers don't have mainframes but are implementing Unix to provide mainframe-level processing to support expanding departmental work groups," he said. ■

CA is porting CA-Unicenter to the dominant server platforms and is working to expand the product's functionality.



meal from different vendors, but none gave us a comprehensive package," Walker said.

Besides porting CA-Unicenter to the dominant server platforms, CA is working to expand the product's functionality. Version 2.0 of CA-Unicenter, due out early next year, will interoperate with the firm's mainframe-based systems management tools. This will enable customers to manage and control different systems functions from the most appropriate platform.

For example, users may want to manage system security from a workstation,

Parallax demos high-quality video

continued from page 19

Each workstation was configured with a Parallax XVideo board, which is an SBus-based card that handles the video processing, and Parallax's new X Window System-based software, which enables users to view the live video within different windows on the workstation as well as capture and store it on the workstation's hard disk.

The workstations were also equipped with a Fore Systems, Inc. ATM network interface card for linking with the Enterprise Hubs over a 100M bit/sec ATM User-to-Network Interface (UNI). Video cameras were linked to the workstations via a video input on the SBus board.

The 100M bit/sec speeds and the hubs' 1.6G bit/sec backplane enable the workstations to take in live video and transmit it across the network in real time. The 7M bit/sec digital video signal consists of two interleaved fields of 640-by-480 pixels transmitted at 60 fields per second. This enables the feed to be higher quality than today's videoconferencing systems, Ricketson said.

The software is just a prototype now but could be offered as an add-on product to the firm's current XVideo system as early as year end, Ricketson said. He declined to provide pricing. ■



FDDI passes tests with flying colors

continued from page 13

could study issues such as response time, acknowledgements, frame loss and retransmission. According to Tolly, an alternative method, such as blasting frames onto the backbone via a frame generator, would fail to simulate a real-world net.

The tested application generated about 10M bit/sec of traffic on the backbone, which was able to support the load as other 802.2 Logical Link Control 2 frames were

added to the backbone in 10% increments. For instance, at 10% load, the application had an average throughput of 10.12M bit/sec, and at 50%, throughput was 10.06M bit/sec (see graphic, page 13).

The tests demonstrated that high-performance applications can be aggregated onto an FDDI backbone. This contrasts with Ethernet and token ring, which typically cannot handle more than one 10M bit/sec application.

"An [Ethernet or token-ring] LAN would be overwhelmed if it had to support this type of [10M bit/sec] application

throughput," Tolly said. "An Ethernet can only handle 10M bit/sec. Even a 16M bit/sec token ring would have 62% of its capacity consumed by a 10M bit/sec application."

A good match

In another scenario, InterLAB examined how well source routing sessions were handled by the FDDI backbone. This metric is important, Tolly said, because many IBM users have multiple token-ring networks interconnected with source route bridges (SRB) and anchored by a

16Mbit/sec campus backbone. When looking to upgrade to a higher speed net, these users require a backbone that will predominantly support token-ring traffic via source routing.

Traffic was sent from a source token ring to a destination token ring five hops away, which essentially forced the Routing Information Field (RIF) data contained within the source route packet through the network. RIF contains information about each ring and SRB that the packet must traverse in order to reach its destination. Therefore, it must be preserved across any intervening network.

The results of these tests demonstrated that the RIF data was preserved across the FDDI net and connectivity between multiple token rings was consistently maintained across the FDDI backbone. In other words, users can feel confident in replacing a token-ring backbone with FDDI.

FDDI's fault tolerance

InterLAB also examined the resiliency of FDDI by initiating failures and measuring their impact on applications running across the backbone. The test measured how well FDDI's inherent redundancy features fared during a network outage.

In one set of tests, the cable between a hub and bridge was pulled. In every test, it took between .7 and 5.8 seconds for the application to recover. This quick switch-

It's curious what passes for interoperable computer systems these days.

Lately, many computer makers are claiming, "Our systems are open." But their customers are asking, "Open to what? *Your* computer environment? Or ours?"

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with UNIX® and PC operating systems—or anchors their systems architecture and corporate strategy. Total interoperability does not yet exist. But a total commitment to interoperability puts Unisys at the head of the industry—and gives our customers a head up on the competition.

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The tests demonstrated that high-performance applications can be aggregated onto an FDDI backbone.



over to the second port kept the applications from being disrupted — an important factor since most IBM Systems Network Architecture sessions time out after 10 seconds.

In a second round of tests, power on a hub was shut off while applications were active, effectively breaking the FDDI ring. The results showed that the remaining two hubs, which were dual-attached, automatically reestablished the ring between themselves by wrapping around the fault. Application recovery times ranged from .9 to 5.7 seconds.

Tolly said session integrity was maintained in every test, and the FDDI backbone reconfigured itself quickly enough so that all applications were able to recover in less than six seconds.

These results on FDDI's resiliency are important to users running mission-critical applications. Ethernet and token-ring nets, in contrast, do not provide the dynamic rerouting capability necessary to avoid session loss in the event of failures.

In subsequent tests to be performed over the next few months, InterLAB will determine how well FDDI supports routing of Transmission Control Protocol/Internet Protocol- and Novell, Inc.'s Inter-network Packet Exchange (IPX)-based data, as well as the performance of FDDI to the desktop. ■

Maybe it's time to look at your phone system objectively.

Maybe the footprint's too big. Maybe the architecture's too fixed. Maybe it's missing some features you need.

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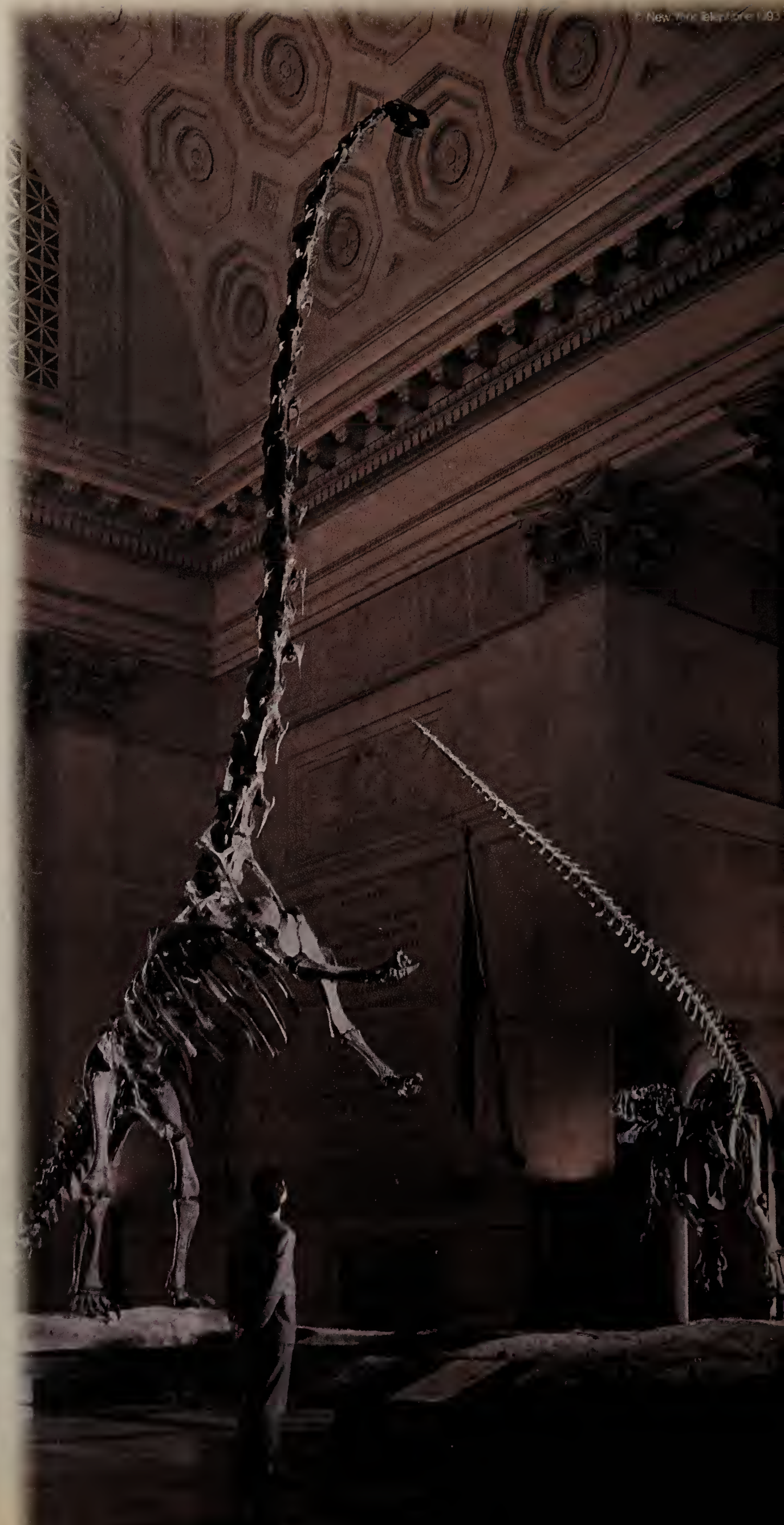
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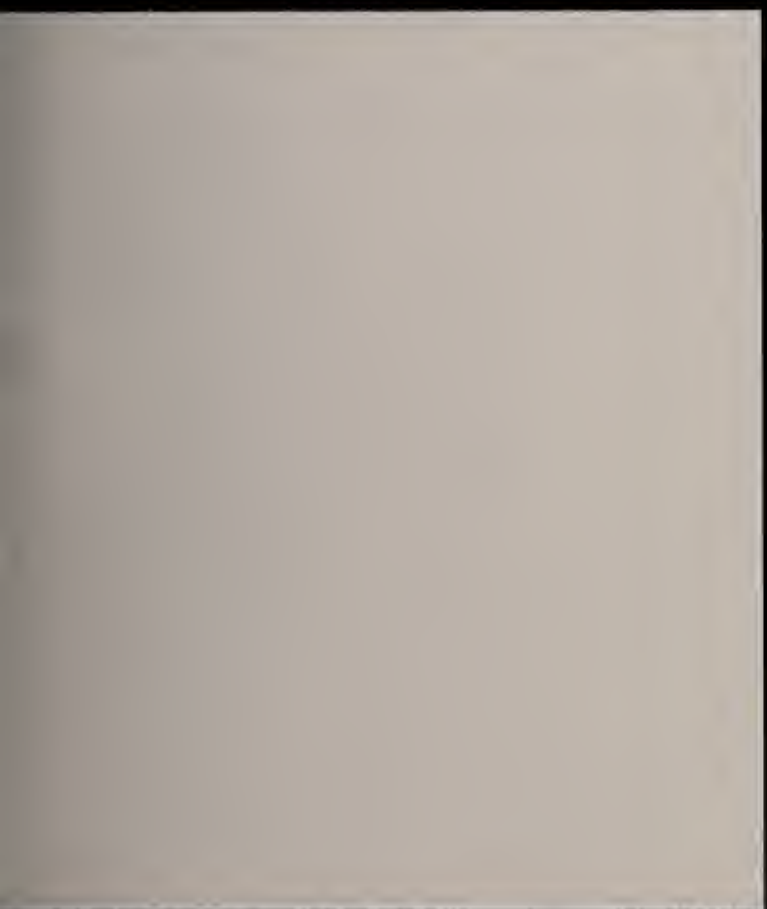
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INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS, ALLIANCES AND FINANCIALS

Worth Noting

To quell user fears about frame relay, vendors must adopt common congestion control, standardize performance metrics and articulate Asynchronous Transfer Mode-frame relay coexistence plans, according to Mary Modahl, director of network strategy research at Forrester Research, Inc. in Cambridge, Mass.

People & Positions

Unisys Corp. has named **Arthur Slotkin** vice president of worldwide outsourcing. Slotkin will continue his current functions as vice president and general manager of the systems support operations division of Unisys Government Systems, Inc. As head of outsourcing, he will be responsible for establishing an outsourcing business base by working directly with Unisys marketing divisions.

Ron Kopeck, previously SunConnect director of net marketing, has joined **Soft-Switch, Inc.** as vice president of marketing, where he will be responsible for all marketing and product management. **Allen Brain**, previously president of Alliant Computer Systems, Inc.'s European operations, has joined Soft-Switch as vice president of International, where he will be responsible for all Soft-Switch international sales and support.

Thomas Hatch, president of hub manufacturer
(continued on page 24)

Systems mgmt. firm Legent sets sights on networks

Broadens focus from centralized IS to LAN users.

By Bob Brown
Senior Editor

VIENNA, Va. — Having established a solid installed base of systems management products, Legent Corp. is turning more of its attention to the needs of network users.

Phil Carrai, vice president of product management for Legent's resource management products, said networking will play a bigger role in the company's strategy as it expands its technology beyond centralized information systems (IS) to local-area network administrators.

Legent is a \$426 million firm founded here in 1989 from the merger of Duquesne Systems, Inc. and Morino Associates, Inc., and is best known for its data center, resource and application development management products.

Over the next 12 to 18 months, Legent plans to port at least two MVS mainframe-based management products to LANs. It also plans to enhance its LAN-based LANspy performance mon-

itor to work on new platforms and integrate with popular management systems, among other things.

Legent will port a LAN capacity planning tool dubbed MICS Capacity Planner, which currently runs under MVS, to a LAN platform. The software will collect data at a server and present it on a

LAN-attached workstation. Similarly, Legent will enable users to run its MICS Accounting and Chargeback product on a LAN server rather than on a mainframe. The software will collect information about network usage for display on a LAN-attached workstation and will enable LAN administrators to measure network usage — user by user, if necessary — on one or more LANs.

"In the mainframe-centric world where we've focused, the big issue our products address is CPU capacity constraints," Carrai said. "In these newer distributed environments, the issue of resource management is more in
(continued on page 24)



Phil Carrai

INDUSTRY BRIEFS

Frame Relay Forum makes headway. The Frame Relay Forum announced progress on several fronts last week at its third annual meeting in Washington, D.C.

According to the organization, it expected an implementation agreement for multiprotocol encapsulation over frame relay to be finished and sent out for ballot to Frame Relay Forum members.

In addition, Alan Taffel, president and chairman of the forum, said the group is readying an on-line database service that would enable users to find out whether their frame relay equipment and services interoperate.

In other Frame Relay Forum news, the group's technical committee has begun work in defining a Simple Network Management Protocol Management Information Base for frame relay, said Rajiv Kapoor, chairman of the forum's technical committee.

Network Systems, ODS sign pact. Network Systems Corp. and Optical Data Systems, Inc. (ODS) last week announced they have formed a strategic alliance under which Network Systems' 6600 series routers will be integrated into ODS' Infinity wiring hubs. The integration effort will provide users with Ethernet, token-ring, Fiber Distributed Data Interface and wide-area
(continued on page 24)

Upcoming in IGOSS

The Industry and Government Open Systems Specification (IGOSS) is a collaborative effort involving the U.S. and Canadian governments, the MAP/TOP Users Groups and the Electric Power Research Institute. Scheduled to become a federal purchasing mandate 18 months after its approval, IGOSS is intended to be a uniform OSI specification. It includes the following standards:

- ☐ 1988 X.400 MHS standard
- ☐ EDI User Agent
- ☐ FTAM Phase 3
- ☐ Virtual Terminal Service (adds features not included in GOSIP Version 2)
- ☐ X.500 Directory Services
- ☐ Remote Database Access
- ☐ Transaction Processing
- ☐ Manufacturing Message Specification
- ☐ X Window System over OSI
- ☐ Information Retrieval
- ☐ FDDI
- ☐ Frame relay
- ☐ Point-to-Point Protocol
- ☐ Intermediate System to Intermediate System routing protocol
- ☐ Interdomain Routing Protocol
- ☐ Network management protocols
- ☐ Upper layer connectionless services

SOURCE: NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY, GAITHERSBURG, MD.

NIST readies third version of GOSIP

Using IGOSS as foundation, will add over 15 new OSI apps to federal purchasing mandate.

By Ellen Messmer
Senior Correspondent

GAITHERSBURG, Md. — The National Institute of Standards and Technology (NIST) this summer plans to issue the third version of GOSIP, which adds more than 15 new OSI applications and services to the federal purchasing mandate.

The Government Open Systems Interconnection Profile (GOSIP) Version 3 will be based on a collaborative effort with the Canadian government and several industry groups that have produced the technical document called the Industry and Government Open Systems Specification (IGOSS).

While GOSIP Version 3 will not be identical to IGOSS — the network address, registration and security requirements may differ — it will use IGOSS as its foundation (see graphic, this page).

Common goal

But this time, federal officials are striving to ensure that the technical requirements for GOSIP are in full harmony with those put forth by other open systems proponents.

Toward that end, NIST has teamed up with the Canadian government, the Manufacturing

Automation Protocol/Technical and Office Protocol Users Groups and the Electric Power Research Institute to create IGOSS.

By backing a common specification, the IGOSS partners hope they will induce more vendors to build OSI-based products that serve their constituencies, which

The sweeping scope of IGOSS promises to fill gaps left by the two earlier GOSIP versions.

▲▲▲

include the federal market, the gas and electric companies, and manufacturers, such as General Motors Corp. and The Boeing Co.

The sweeping scope of IGOSS promises to fill many gaps left by the two earlier GOSIP versions.

The OSI Intermediate System-to-Intermediate System routing protocol, for example, was not listed in earlier GOSIP versions since the standard had not been finalized.

(continued on page 24)

Systems mgmt. firm sets sights on nets

continued from page 23

the network and net server areas. We're looking to give LAN administrators more information — they're asking for it."

Legent's primary LAN-based product, LANspy, will also be enhanced in several ways. The product currently runs on a DOS-based server and passes response-time data to the IS shop for review. The new version, to be available in 12 to 18 months, will enable the LAN administrator

to review this information from a workstation running Legent's resource management software.

The company also plans to build Simple Network Management Protocol capabilities into LANspy so it can feed data to popular SNMP-based net management systems, such as SunConnect's SunNet Manager.

Legent also plans to roll out an Ethernet version of LANspy, which currently is designed to monitor only token-ring nets. That product will likely be available during the second quarter. **■**

NIST readies third version of GOSIP

continued from page 23

Two other OSI routing protocols — the End System to Intermediate System and the Connectionless Network Protocol — are already mandatory purchasing requirements defined in GOSIP 1 and 2.

Federal agencies have already started buying some of the applications listed in IGOSS, such as 1988 X.400 and X.500 Directory Services. But a host of new OSI-based applications, including Transaction

Processing, Remote Database Access and Information Retrieval, will force federal agencies to employ OSI in client/server environments.

GOSIP 3 will also include new versions of Virtual Terminal and File Transfer, Access and Management (FTAM), which appeared in the earlier versions of GOSIP. According to Tim Boland, a computer scientist at NIST, FTAM Phase III adds features such as new character sets but is backward-compatible with the older FTAM version.

The IGOSS document will be out for public comment until May 15. A final version is scheduled to be published by NIST this fall.

Separately, NIST will release GOSIP Version 3 sometime this summer, listing the new purchasing requirements that will go into effect as a federal purchasing mandate 18 months later. **■**

Industry Briefs

continued from page 23

network connectivity.

Network Systems is based in Minneapolis, and ODS is located in Dallas.

BT, Novadyne strike partnership. BT North America, Inc., a San Jose, Calif., value-added network provider, has signed a three-year, \$55 million agreement with Novadyne Computer Systems, Inc. under which Novadyne will provide maintenance and installation services to BT North America.

Novadyne, which runs a nationwide support organization, is based in Santa Ana, Calif. **■**

People & Positions

continued from page 23

Chipcom Corp., has resigned to pursue opportunities outside of the company.

Robert Badavas, chief financial officer at Chipcom, has assumed responsibility for the company's manufacturing operations until a permanent successor is hired.

In a reorganization of its operations, **Cap Gemini America, Inc.**, which is based in New York, has appointed four division managers to oversee sales in its U.S. operations.

Susan Larson, formerly manager of the Denver branch, has been appointed West Division manager, where she will be responsible for sales in the West and Northwest.

Don Kelly, formerly regional manager in the Northeast commercial region, has been appointed South Division manager, where he will oversee sales in the South and Midwest.

Milo Chelovitz, formerly area manager for the Ohio Valley and Chicago areas, has been named Central Division manager, where he will be responsible for sales in central U.S. locations, including Detroit, Pittsburgh and Indianapolis.

Jim Woodward, formerly vice president of technical services, has been appointed East Division manager, where he will oversee sales in the New York, Baltimore and Washington, D.C. areas. **■**



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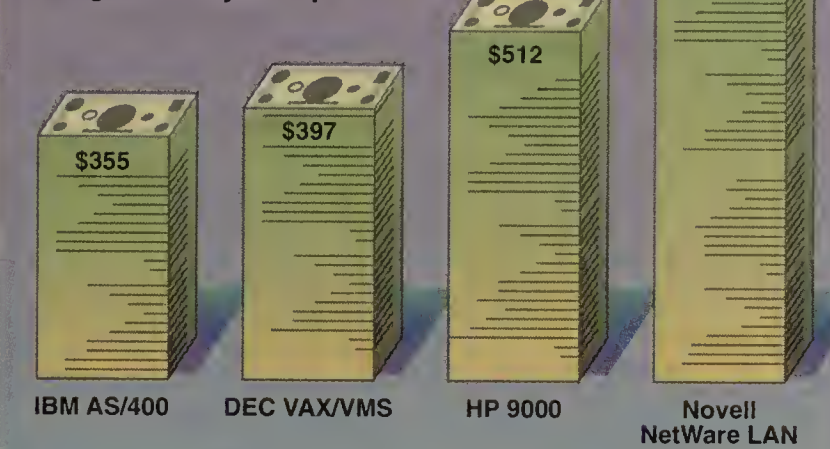
“It’s certainly something I hope nobody has to go through again. It’s given us a lot of practice in contingency that I’d rather not have had.”

David Diaz

Senior vice president of group information technology
Dean Witter, Discovery & Co.
New York
Referring to the recovery from the recent bombing of the World Trade Center

Evaluating distributed net costs

Average monthly cost per user



The per-user cost of an AS/400 in a distributed network environment is much less than a NetWare LAN, according to an IDC study. Costs associated with operations staff accounted for nearly half the per-seat expense of a NetWare LAN.

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS.

Study finds AS/400 to be cost-effective net platform

By Joanne Cummings
Senior Writer

FRAMINGHAM, Mass. — A study examining the most cost-effective platform for supporting distributed on-line transaction processing (OLTP) applications has given high marks to IBM’s AS/400 minicomputer.

The study, conducted by International Data Corp. (IDC), a market research firm here, proposes a “cost-to-use” model based on real-world customer environments, including factors such as operations staff required, application costs and development staff costs.

The study compares four platforms — IBM’s Application System/400, Digital Equipment Corp.’s VAX/VMS, Hewlett-Packard Co.’s HP 9000 and a Compaq Computer Corp. ProSignia i486 server-based NetWare local-area network — in large distributed and decentralized enterprises.

Distributed enterprises were characterized by several small, similarly configured sites supported primarily by a central location, while decentralized enterprises were marked by fewer, larger, similarly configured sites supported separately.

In a typical distributed environment, the AS/400 was the least expensive platform overall, costing just \$355 per user per month, compared with \$670 for the NetWare configuration (see graphic, this page).

The distributed hardware costs ranged from \$106 per user per month with the HP 9000 to \$133 with NetWare. The cost of minicomputer hardware was

based on the boxes, plus a mixture of 60% personal computers and 40% terminals. The LAN hardware consisted of PCs and 486-based servers. Both were based on 115 distributed sites with 16 users per site.

The cost difference became more marked when evaluating the number of people required to support OLTP applications.

According to the study, the AS/400 and VAX systems, because of their strong systems management capabilities, cost just \$36 per user per month in this category, roughly one-tenth the cost of NetWare.

Chris Christiansen, research director for worldwide commercial systems at IDC, said because NetWare lacks comprehensive management facilities, users will likely require at least one staffer at each site. As a result, 44% of NetWare’s cost comes from operations staff expenses. He added that minicomputers can be managed centrally without local support.

In decentralized environments, however, NetWare becomes more attractive, although the AS/400 still scores rather well. Decentralized NetWare costs run at about \$552 per user per month, compared to \$606 for the AS/400, \$752 for the VAX and \$848 for the HP 9000. Again, operations staff costs were the determining factor.

Because NetWare applications tend to be easier to support, staff costs range from NetWare’s low of about \$244 per user per month to the HP 9000’s high of \$510 per user per month. ■

THE INTERNET

BY ED KROL

Conducting searches on the Internet

Last month, we talked about finding things on the Internet using menus. But most of the time, you don’t want to page through menus in order to find something; you want to be able to search for key words or phrases and let the magic of computers do the work for you. For these kinds of searches, the Internet offers Wide Area Information Servers (WAIS).

WAIS is a client/server system, with the client portion being software that runs on your computer and lets you formulate questions to be asked of various sources. The server portion consists of databases offered on several servers throughout the Internet.

When you do a query, your client contacts each server you specify in the search and matches the words in the question against words in an index built especially for this purpose. It returns the titles of items that match the question you posed. After displaying the titles, WAIS lets you choose to retrieve any number of them, and will display the items or send them in a file.

Servers typically contain a collection of textual files and an accompanying index of key words. For example, to build a source of *Network World* articles, each article from the past year would be put in a separate file. An indexing utility would create the index and bring up the server software.

You could then ask the source questions such as “Find all the articles that contain ‘Novell, Inc., 10Base-T and Internet Protocol.’” WAIS would list the titles of articles it found, and you could then select several.

Since the search is done using an index rather than the actual file, retrievals can consist of any file type, including graphics.

If you’ve been reading carefully, you probably see what appears to be a big flaw in this system. If you have to tell WAIS which sources to look in and anyone can put up a source, how do you know what sources exist? The answer is that there is a source of sources.

Anyone wanting to offer a public source can have it listed in a WAIS source, the Directory of Servers. So a person wanting to ask networking questions would first ask the server directory where to

look. It would presumably respond, “The *Network World* Server,” and you would steer your client there to ask about Novell, 10Base-T and IP.

WAIS works best if you have your own client with a nice user interface, like Apple Computer, Inc. Macintosh or X Window System. These clients are freely available over the Internet through an anonymous File Transfer Protocol (FTP) from ftp.think.com.

But if you don’t want to go through the effort of installing a client, there is also a public line-oriented client available by remotely logging on using Telnet to quake.think.com and giving “*wa*” as the sign-on name.

Note: In my column last month, I told you how great Gopher was but neglected to tell you how to try it. Sorry about that. There are two Gopher servers anyone can access using Telnet. One is consultant.-micro.umn.edu and the other is at gopher.uiuc.edu (use *gopher* as the sign-on name). ■

Krol is author of *The Whole Internet* (O’Reilly & Associates, Sebastopol, Calif., 1992) and assistant director for LAN deployment at the University of Illinois at Urbana-Champaign. He can be reached at e-krol@uiuc.edu.



Manager Minutes

Network World is sponsoring “Managing Windows on the Network,” an in-depth seminar being held in 10 cities across the country between May 3 and June 4.

The seminar will cover key issues of Windows networking, including net performance optimization, optimum hardware configuration, managing user software access, controlling security, user/group management, installation methods and local-area network-specific problem areas. Features and benefits of Windows NT will also be explored.

The seminar costs \$350. To register, call (800) 643-4668.

SHARE, an international organization for users of IBM and other computing equipment, announced that it will be holding its first trade show in conjunction with its annual summer meeting Aug. 15-20 in Washington, D.C. Called “The SHARE Technology Exchange,” the show will offer demonstrations of how IBM and open systems technologies can coexist on a net.

SHARE can be reached at (312) 644-6610. ■

OPINIONS

TELECOMMUNICATIONS REGULATION

BY ALAN PEARCE

It's time for the judge to move on to greener pastures

Judge Harold Greene, the man in charge of the Modified Final Judgment that outlined the settlement of the AT&T antitrust suit 10 years ago, turned 70 last month. It's time for him to step down and leave the regulation of the regional Bell holding companies to the Federal Communications Commission.

The federal government has given Greene three options:

- He can continue to be a federal District Court judge at an annual salary of \$133,600.
- He can take "senior status" on the court, which means he can handle fewer cases and still collect the \$133,600 a year.
- He can retire on an annual pension of \$133,600 for the rest of his life.

Greene appears to be going for Option 1 — at least for the time being — even though it is clear that the Clinton-Gore administration wants to dump the MFJ and allow the RBHCs to

enter lines of business from which they are now excluded by the judgment, namely equipment manufacturing and long-haul services.

The MFJ's primary objectives were to break up the Bell System into eight separate parts — AT&T and the seven RBHCs — and stimulate full and fair long-haul competition by implementing equal access. Both goals have been achieved.

Because there was some doubt as to whether the Bell System could be successfully split up, business restrictions were imposed on the RBHCs to make sure they did not favor each other or AT&T.

These lines of business restrictions prohibited the RBHCs from providing information services or long-haul services and manufacturing telecommunications equipment. Greene lifted the information services restriction in the summer of 1991, but the other restrictions remain.

In the nine years since the breakup, the RBHCs have not only divorced themselves completely from AT&T, but now they also compete vigorously among themselves. In short, the MFJ has been a resounding success, and the line of business restrictions it still contains can be abolished.

The major reason Greene has given for maintaining his grip on the RBHCs via the MFJ is that he never believed that the FCC, under Reagan-Bush leadership, had the commitment to regulate the RBHCs effectively. He no longer has that excuse. President Clinton and Vice President Gore are not only interested in and knowledgeable about the communications industry, but they also intend to give it a high-priority ranking as part of their economic and technology planning initiatives over the next four years.

Why doesn't Greene step down? Even if he opts to continue working full time as a federal District Court judge, it's time for him to loosen his grip on the RBHCs and leave the industry's regulation to the FCC. If Greene doesn't retire himself, the new administration or Congress may do it for him. It's far better to move over of your own volition than to be shoved out. **■**

Pearce is president of Information Age Economics, Inc., a telecommunications research firm in Washington, D.C. He can be reached at (301) 320-3608.



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EDITORIAL

We repeat: Mutual aid is a good idea

Back in August, our Reader Advocacy Force examined New York's Mutual Aid and Restoration agreement and found that carriers in the Big Apple are better prepared to handle a network emergency because of this user-led effort.

That was borne out when a terrorist bombing of the World Trade Center sent users scrambling to get back on-line at new sites.

One bright spot, users said, was that carriers were able to re-route lines relatively quickly to temporary offices and backup computing facilities.

Carrier officials attributed that to the aid agreement, which requires service providers in the

metropolitan area to establish contacts, outline procedures and participate in disaster drills to prepare for a major problem. The agreement grew out of an unprecedented lobbying effort by users and city officials who pressured local and long-haul carriers into the first-of-its-kind backup pact.

But New York remains alone in having such a plan. The Federal Communications

Commission, through its Network Reliability Council, has made little progress toward any national mutual aid system largely because the carriers participating in that forum have — not surprisingly — urged voluntary rather than mandatory co-

operation.

That leaves the ball squarely in the users' court. Network executives in major metropolitan areas would be wise to follow the lead of their New York brethren in pushing municipal officials and regulators to get carrier cooperation on mutual aid.

Top user organizations, such as the International Communications Association and the Tele-Communications Association, Inc., could take real leadership roles in this area.

As users embrace new high-speed data services to support distributed applications, public network reliability becomes an increasingly important concern. Don't wait to find out how well your carriers are prepared to deal with a disaster. **■**

NETWORK WORLD'S



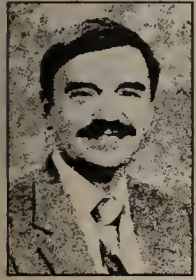
READER ADVOCACY FORCE

OPINIONS

REALITY CHECK

BY THOMAS NOLLE

ATM must clothe itself in cost justification, not naked hype



Asynchronous Transfer Mode (ATM) has been like the emperor in the old fairy tale, running about in the buff before an admiring audience whose interests forbid unvarnished appraisal of its state of dress. But some urchins have finally yelled, "Hey, it's buck naked!" The technology's illusory fancy clothes can't hide the current lack of cost-justification for ATM.

However, two recent ATM announcements indicate carriers and vendors are realizing that users are starting to see through the hype surrounding ATM and demand some substance to go with the flash. One is from a prospective ATM carrier, AT&T, while the other is from an ATM customer premises equipment vendor, ADC Fibermux Corp.

It was widely speculated that AT&T would announce service availability and pricing, with the service comfortably far in the future and the price couched in a thousand qualifiers.

Instead, in its Feb. 2 announcement, AT&T unveiled a four-phase program that it calls Quality Function Deployment (QFD). QFD isn't glamorous, but it is a realistic presentation of how AT&T would offer ATM to businesses.

The first phase of the QFD program is what AT&T calls shared learning, in which industry views on ATM applications and service needs are collected, and limited off-network trials are conducted. This phase is under way.

The second phase will be a service definition period, in which the specific parameters of ATM service, such as access speed and support for permanent or switched virtual circuits,

will be defined.

This definition phase, likely to be completed by year end, will provide us with the first detailed look at an ATM service offering that is likely to be broadly deployed. It is even possible that some price data will be developed. Actual users will get to see AT&T's service in the third and fourth phases — first in a controlled introduction to businesses with early ATM needs and then in a general offering. These are likely to come in the second

Carriers are realizing that users are starting to see through the hype surrounding ATM.



and fourth quarters of 1994, respectively.

The second effort to dress the ATM emperor in real clothes — the ATM customer premises equipment announcement from ADC Fibermux — is a masterpiece of underselling in a marketplace that has done nothing but drastically oversell ATM. On Feb. 16, ADC Fibermux announced what it touts as a cost-effective switching hub with a wrinkle — it uses ATM technology.

The ADC Fibermux approach recognizes the aspect of ATM hubs that generates the real benefit to the user is switching hub technology. With an ordinary shared-media local-area network, the transport capacity of the LAN equals the access speed of each user.

To make such a LAN capable of carrying more traffic, you have to increase the LAN's speed

(from 10M to 100M bit/sec, for example) and throw away all of the adapters connected to it.

With switching hubs, the backplane capacity or bus capacity of the hub is the transport capacity of the LAN, and the LAN can be made to carry more traffic by upgrading that backplane/bus alone.

Switching hubs can help protect user investment as LANs evolve toward higher traffic in support of distributed computing or even — if we solve the delivery issues — multimedia.

The ADC Fibermux message to the user is simple: Buy this hub because you believe in switching hubs, not because you believe in ATM. If ATM happens to be the way of the future, you're ahead of the game. If not, you've risked nothing because the hub won't cost more than other switching hubs based on non-ATM technology. ADC Fibermux hasn't justified ATM to the desktop, but it has at least created an affordable way to take the first step.

Hype generates interest, but it doesn't sell products or services. For that, you need cost-justification. AT&T has promised, with its methodology of ATM service development, a business-directed set of ATM services and a price based on businesses' willingness to pay.

ADC Fibermux has delivered a way to get ATM onto the premises without depending on ATM applications, which don't exist, to justify it. Now, if enough users pick up the cry for real business justification of ATM, we'll get it — or we'll disqualify ATM from consideration. **Z**

Nolle is president of CIMI Corp., a technology assessment firm in Voorhees, N.J. He can be reached at (609) 753-0004 or via MCI Mail at 349-5845.

TELETOONS

BY FRANK AND TROISE

The Network Manager's Handbook RULE 56

In today's budget-conscious networking environment, you must meet users' demands for higher levels of service by pulling strings:



and another thing . . .

ATTENTION VENDORS: *Network World* invites you to participate in product surveys for upcoming Buyer's Guides. These Buyer's Guides will examine the critical selection criteria and current market trends that influence the purchase of various products and services.

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SwissTelecom



TCP/IP undergoes a metamorphosis of sorts

The caretakers of TCP/IP set in motion projects to bolster the protocol suite's allure.

With spring approaching fast, network managers may want to keep watch on the TCP/IP protocol suite. The lingua franca of the networking world has been undergoing a metamorphosis of sorts and is about to show its new colors.

While proprietary protocol suites such as IBM's Systems Network Architecture and Digital Equipment Corp.'s DECnet are evolving to support distributed networks, the caretakers of TCP/IP have initiated projects on a number of fronts to bolster the protocol suite's range of services.

Transmission Control Protocol/Internet Protocol — which is already more than 20 years old — is being outfitted to address such issues as extended addressing, audio/video multicasting, enhanced network management, new formats for electronic mail and support for emerging wide-area network protocols. All of these enhancement projects are under the direction of the Internet Engineering Task Force (IETF), the organization that oversees technical enhancements and standards for the Internet.

The upshot, TCP/IP proponents say, is that the protocol suite will emerge with a stronger set of services and other capabilities to build on its past surge in popularity.

"TCP/IP is much stronger than anything else in its availability of widespread applications," says Scott Bradner, a consultant at Harvard University's Office of Information Technology. "And these are available because of TCP/IP's background in Unix, and research and engineering environments."

Addressing dilemma

One of the major TCP/IP issues the IETF is examining is a shortage of a certain class of addresses used by many corporations. The IETF has received several proposals aimed at extending addressing to

resolve the problem, but it has yet to adopt any of them or even indicate which has the inside track.

The addressing problem is an interesting one. Each device on the Internet or in a user's private TCP/IP net has an assigned address. This address is carried within the IP header in two 32-bit fields of a datagram, which specifies both the source and destination for that data. These addresses are further di-

Within the Internet, the fixed addressing formats limit the number of addresses that can be assigned for a particular class. For example, only 16,384 unique Class B addresses, which are used by most corporations, are available. Although that seems like a high number, Class B addresses are currently in short supply.

If nothing is done, the Class B addresses available for assignment may be exhausted either this year or next. This would leave only Class A addresses, which have a Host ID portion that is too large for most organizations, or Class C addresses, which have a Host ID portion that is too small.

"The IP protocol is a victim of its own success," says Larry Thomas, president of LAN Solutions, a systems integration consultancy in Thousand Oaks, Calif. "And portable office applications and personal [wireless] communication will significantly increase the need for more addresses."

The IETF, however, is examining a number of proposals to remedy the addressing dilemma. The key to solving the address exhaustion issue is a two-step approach. The first step, known as classless inter-domain routing (CIDR), involves assigning those addresses that are still available. With CIDR, blocks of Class C addresses are allocated to network service providers, which are then reallocated as required. In effect, this slides the window between Network and Host IDs, opening up a greater number of addresses to users.

Secondly, the IETF is in the midst of evaluating enhancements to the IP.

One of the proposed solutions is a completely new protocol, developed at Bell Communications Research, called the "P" Internet Protocol (PIP), which is supposed to replace the existing IP. PIP attempts to resolve the address shortage by using variable length addresses that allow for an arbitrary number of address assignments. In addition, each PIP address is encoded in a separate field, allowing each level of the hierarchy unlimited growth. PIP is backward-compatible with IP Version 4.

In addition to devising a solution to the addressing problem, PIP adds several features to the existing IP. Among these are the ability to select from

vided which into three subfields, specify the network, sub-host. Five different classes of IP addresses have been defined — A, B, C, D and E — and are identified by the first few bits of the address (see "Making distinctions among IP addresses," page 33).

By MARK MILLER



(continued from page 29)
multiple backbone carriers, support for mobile hosts and support for routing through a public data network.
"Backbone carrier selection is analogous to being able to pick your long-distance telephone carrier," says Paul Tsuchiya, a member of Bellcore's technical staff. Suppose, for instance, one carrier provides real-time support at more expense, while another carrier provides only file-transfer and electronic mail services at a lower expense. "This feature [of PIP] allows the user to choose the most appropri-

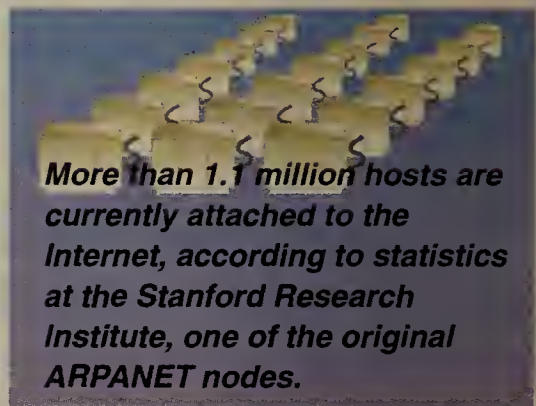
ate service," he adds.
Researchers from Bellcore, DEC and the academic community have proposed a second solution to the problem of Class B addressing. The effort, known as TCP/UDP with Bigger Addresses, takes existing applications that use either TCP or the User Datagram Protocol (UDP) and runs them over a non-IP network.
Two ISO protocols, the Connectionless Network Layer Protocol (CLNP) and End System to Intermediate System (ES-IS), would serve as the underlying network layer protocols to support TCP and UDP appli-

cations. The 160-bit CLNP addresses, when compared to 32-bit IP addresses, dramatically solve the problem of address exhaustion. Conversion from one addressing scheme to another would require a dual protocol stack within network devices.
Yet another proposal aimed at remedying the addressing issue goes even further. Called IP Version 7, or IPv7, seeks to resolve addressing limitations by increasing the available IP address space in source and destination addresses to 64 bits. This includes the existing address (32 bits),

plus a 32-bit IPv7 extension.
"IPv7 uses and builds upon the huge existing investment in TCP/IP software," says Robert Ullmann, a senior software engineer at Process Software Corp. in Framingham, Mass., who developed and pitched the idea. "Since IPv7 is a new version of IP, routers do not require a dual protocol stack, but instead handle IP datagrams as a subset of the normal IPv4 datagram function."
While the IETF has not yet made any decision on which proposal to adopt, it is scheduled to meet later this month, at which time it is expected to narrow its choices.

Audio/video multicasting

While solving the Class B addressing problem is a top priority, the IETF is tackling a separate issue to add support for a new type of messaging service to the protocol suite.



More than 1.1 million hosts are currently attached to the Internet, according to statistics at the Stanford Research Institute, one of the original ARPANET nodes.

Somewhat analogous to a broadcast facsimile of a document, IP multicasting is a method of sending the same data to multiple receivers on an internet.

The Internet is now experimenting as well with delivering audio and video to multiple locations — known as A/V multicasting.

"The goal of A/V multicasting over packet networks, as compared to more traditional teleconferencing, is to take advantage of the processing power of the workstation, and the established network infrastructure to allow widespread use," says Stephen Casner, chair of the IETF's Audio/Video Transport Working Group.

The benefits to users would be enormous. Corporations could use the technology as a means to disseminate information to key managers or even to tie personnel into presentations or seminars without requiring them to travel.

"We are looking at A/V multicasting as a way of enhancing communication on our campus backbone," says Charley Kline, network architect at the University of Illinois — Champaign/Urbana campus. The university has been using multimedia communications for some time now and is in the process of developing Macintosh software to support audioconferencing across IP.

"We can envision the day when we can broadcast live lectures and demonstrations to our dorms, which are being networked with 10Base-T," Kline says. "Perhaps sometime in the future, these broadcasts could go to other campuses, as well."

To date, the IETF has conducted two experiments into A/V multicasting. An experiment at a March 1992 IETF meeting demonstrated the viability of transmitting

(continued on page 32)

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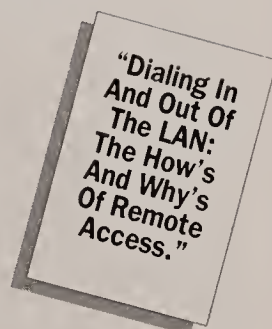
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Vendors embrace TCP/IP with open arms

Vendor competition for control of user networks is keen in today's multiprotocol and multi-vendor environments — and the winner stands to gain a sturdy foothold in the customer's pocketbook.

The key to controlling those user networks is the transport protocol supported on them. A 1992 survey of 954 organizations by market analyst International Data Corp. of Framingham, Mass., reveals that IBM's Systems Network Architecture still leads among protocols in use, with Transmission Control Protocol/Internet Protocol and Digital Equipment Corp.'s DECnet following closely behind (see graphic).

Future studies may chronicle a different story, however. In this case, the wide acceptance of TCP/IP has caused DEC and IBM to enhance, rather than compete with, the use of TCP/IP.

Within SNA environments, for instance, customers are demanding access to their data and applications across a number of transport protocols, including SNA, Advanced Peer-to-Peer Networking and TCP/IP, says James Holland, IBM TCP/IP product manager.

"IBM considers TCP/IP to be

fundamental to the concept of open networking protocols and is committed to providing these integrated solutions," Holland says.

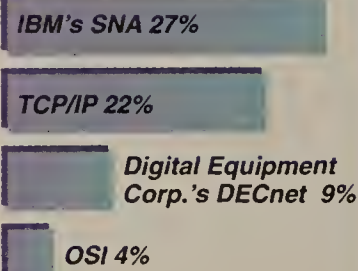
"With TCP/IP and SNA integrated into the Networking Blueprint, end-user applications become independent of the network transport. The customer then has the flexibility to choose the transport that best serves their needs," he says.

DEC's approach and philosophy is that customers will make the determination as to which protocol, or set of protocols, are best suited to meet their specific business needs, says Jeff Low, director of Networks Marketing at DEC. "In the next few years, we expect to see less use of proprietary-based protocols and a larger base of OSI and TCP/IP systems," Low says. "We cannot expect proprietary protocols to disappear in the meantime, nor one single protocol to emerge as the dominate solution. Instead, the multiprotocol networks that we have today will remain well into the future."

A forecast of worldwide TCP/IP and Open Systems Interconnection expenditures conducted by Infonetics Research, Inc. of San Jose, Calif., indicated

that the OSI protocols will not prove to be in great demand in the near future. "TCP/IP expenditures have been ahead of OSI

Transport protocols used



Findings are based on a 1992 International Data Corp. survey of 954 user sites.

investment in every year since 1989," says Michael Howard, president of Infonetics.

Infonetics projects that this trend will continue into 1994. "Users are buying TCP/IP and continue to think of OSI as a very limited future possibility — OSI transport networks will not be common.

The mainstay OSI products will be where TCP/IP does not have an adequate solution and where OSI is mandated or strongly seen as the great salvation of interoperability," Howard says.

— Mark Miller

(continued from page 30)
an audio teleconference via the Internet. A subsequent experiment at the November 1992 IETF meeting extended the concept to video signals.

Outside of these tests, the IETF has not formally adopted

making rapid improvements is at the network management level. The IETF has been at work over the last several months to develop enhancements to the Simple Network Management Protocol.

Originally envisioned as an interim solution while the world

Due to the success of SNMP, the IETF plans to address such issues as security and performance enhancements in SNMP Version 2. Many of these enhancements are intended to address the needs of larger networks and internetworks. Performance issues, such as the rapid and efficient retrieval of large quantities of bulk data, are one of the SNMP design team's major goals, according to Jeffrey Case, president of SNMP Research, Inc. and one of the four authors of SNMP Version 2.

The idea of enabling SNMP-based managers to get at large blocks of management data will help users conduct a massive dump of a Management Information Base (MIB), as opposed to issuing separate GET NEXT requests to obtain data in a serial fashion.

Case says other areas of concern are strengthened diagnostics and improvements in the capabilities for communications between SNMP managers. This latter improvement could ultimately enable manager-of-manager systems, such as Sun Microsystems, Inc.'s SunNet Manager, to communicate directly with other SNMP managers from other vendors.

With the growing number of firms supporting SNMP, these en-

hancements will be welcome. "The largest shortcoming of the current version of SNMP is network security," says Mike Bailey, a systems integrator at Lockheed Missiles & Space Co. in Sunnyvale, Calif. "User and node verification needs to be included as part of the protocol."

While many users welcome these improvements, others are concerned with more current issues. "Lots of vendors do sleazy things, such as providing a really sophisticated graphical user interface, but not bothering to implement all of MIB-II," says Rodney Thayer, president of Sable Technology Corp., a Newton, Mass., networking consultancy. "The resultant interoperability problems overshadow the advantages that the GUI has provided."

ing and future transport protocols. More importantly, existing user mail agents must be able to receive MIME messages as they have with RFC 822. In order to assure smooth support for MIME messages, vendors are working on enhancements to most of the popular Unix mail agents.

The results will be quite beneficial to users. "We get the benefits of MIME, multimedia and all the rest, without having to change SMTP in any way," says Ned Freed, chief development officer of Claremont, Calif.-based Innosoft International, Inc. and one of the developers of MIME.

E-mail users are enthusiastic about the MIME enhancements. "MIME mail gateways, while not widely deployed on the Internet, will eventually give us the ability

‘‘We get the benefits of MIME, multimedia and all the rest, without having to change SMTP in any way,’’ Freed says.



Fortunately, users will not have to wait long. Case expects requests for comment (RFC) regarding SNMP Version 2 to be completed sometime between March and June, with product announcements continuing through this summer. But as with any new protocol, users should not be surprised if some vendor bugs and incompatibilities arise.

Multimedia mail

E-mail has long been one of the most popular applications within the Internet protocol suite, with the message format defined by RFC 822, which has been in place since 1982. At that time, ASCII text was the most frequently used format for the exchange of information between dissimilar computers. Today, however, it is a different story. The emerging world of multimedia dictates that the limitation of ASCII-based messages be lifted, which is why the IETF has developed an enhancement known as multimedia Internet Mail Extensions (MIME).

Backward compatibility with existing systems is essential to ensure widespread support of any new messaging application. In addition, MIME must be independent of the underlying exist-

to exchange multiattachment and non-ASCII mail messages between different mail systems," says John Cornell, network specialist at San Francisco-based Pacific Gas and Electric Co.

"For example, obtaining a software patch for one of our devices would involve a two-step process: learning of the patch via E-mail, and downloading the patch using [File Transfer Protocol]," he continues. "By using

TCP/IP enhancements

Figure 1

	RFC	Subject
1993 Jan.	Draft	SNMP Version 2 documents
1992 Dec.	Draft	Multiprotocol Interconnect over Asynchronous Transfer Mode
Aug.	1356	Multiprotocol Interconnect on X.25 and ISDN
	1347	TCP/UDP with Bigger Addresses
June	1341	Multipurpose Internet Mail Extensions
Jan.	1294	Multiprotocol Interconnect over Frame Relay
1991 Mar.	1209	Transmitting IP datagrams over Switched Multimegabit Data Service
1990 Oct.	1188	Transmitting IP datagrams over FDDI

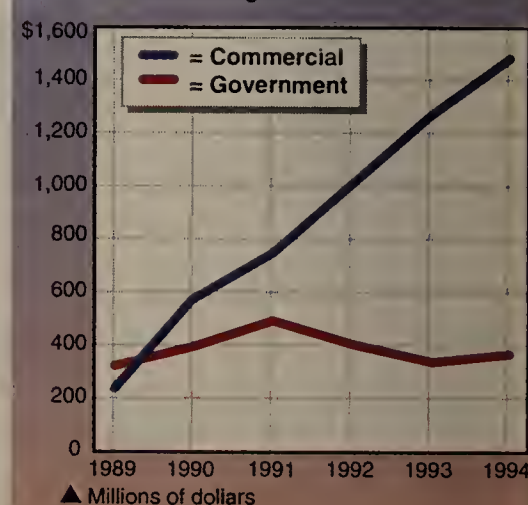
These recent Request for Comments (RFC) and draft papers chronicle the proposed enhancements to the TCP/IP suite.

GRAPHIC BY SUSAN SLATER

SOURCE: DIGINET CORP., BROOMFIELD, COLO.

TCP/IP expenditures

Figure 2



Commercial use of TCP/IP will continue to skyrocket compared to other market sectors.

SOURCE: INFONETICS RESEARCH, INC., SAN JOSE, CALIF. GRAPHIC BY SUSAN SLATER

the technology, which is still under study. Users, such as the University of Illinois, have benefited from IETF work and have begun using A/V multicasting.

One area where the IETF is

waited for Open Systems Interconnection network management to mature, SNMP provides network management solutions for everything from adapter cards to IBM mainframes.

MIME, the message and the patch can be communicated in a single step."

MIME has been received by users enthusiastically; in fact, a number of mailing lists on the Internet use the new format for correspondence with readers. These

messages can be identified by the "MIME Version" in the header.

Internet mail vendors are also among MIME's supporters. Inno-soft markets the PMDF family of products, a store and forward, multiprotocol E-mail solution for DEC VMS systems. Frontier Technologies Corp. of Mequon, Wisc., has recently announced a product known as SuperTCP for Windows, which also includes full MIME extensions.

"The proposed MIME standard is just the beginning, however," Freed says. "The significant work is elsewhere, in the dozens of documents that are in various stages of construction and/or approval, that describe a multitude of new MIME subtypes for anything and everything."

The first round of work on enhanced SMTP concluded recently with the production of several standard proposed RFCs — RFC 1425 to RFC 1427. One of the things these documents do is specify how to extend SMTP so it can carry eight-bit MIME data. This enhancement to SMTP allows MIME data to be transported more efficiently.

If MIME succeeds and is deployed widely, the result will be

nothing short of a completely new form of messaging.

WAN/OSI support

MIME may be one of the newest applications enablers on the Internet, but there are other efforts under way to bring OSI applications level services into the TCP/IP domain.

While the OSI suite of protocols was viewed as a panacea for networking ills 10 years ago, the reality is that TCP/IP has prevailed in users' hearts and networks.

But there are moves afoot to pick the best of the OSI applications and run them over TCP/IP networks. By folding OSI applications level services into the TCP/IP protocol suite, some users can gain the benefits of OSI applications without having to change their underlying network

transport.

OSI products, such as the Intermediate Station-to-Intermediate Station (IS-IS) protocol, and X.400/X.500 electronic messaging standards are finding their way into the TCP/IP protocol suite.

Besides layering OSI applications into the TCP/IP suite, the IETF has taken steps to support

new high-speed data services, such as frame relay and Switched Multimegabit Data Service (SMDS). Support is currently in place for SMDS via RFC 1209, "Transmission Of IP Datagrams Over The SMDS Service," and for frame relay via RFC 1294, "Multiprotocol Interconnect over Frame Relay," with draft documents available detailing Asynchronous Transfer Mode (ATM) connections.

"The strength of TCP/IP is its openness and compatibility with nearly any lower layer network infrastructure," says Gary Kessler, vice president of MAN Technology Corp., a networking consultancy in Colchester, Vt.

According to Kessler, multiprotocol interconnection and encapsulation of IP over local-area networks, Integrated Services Digital Network, X.25, Fiber Distributed Data Interface, SMDS, frame relay, ATM and others ensures TCP/IP's continued use. "It also implies increasing flexibility in the options for the Internet backbone," he says. ■

Miller is president of Digi-Net Corp., a Denver-based data communications engineering firm. His latest book, Troubleshooting TCP/IP, contains an analysis of the Internet protocols. Miller may be reached via the Internet at mark@csn.org.

Making distinctions among IP addresses

Within the Transmission Control Protocol/Internet Protocol suite, all 32-bit IP addresses are divided into Host ID and Network ID sections: The former identifies a unique host on the net, while the latter encodes the identification of the network to which a host attaches.

IP addresses may take one of five formats.

IP address formats differ in the number of bits allocated to the Host and Network IDs and are identified by the first three bits. Class A addresses are easily recognized because the first bit is equal to 0. Bits 1 through 7 identify the network segment — whether public or private — and bits 8 through 31 identify a specific host on that network.

With a seven-bit Network ID, only 128 Class A addresses are available. Of these, addresses 0 and 127 are reserved for other uses.

Class A addresses are designed for very large networks having many hosts. They are rarely assigned to users, and those that receive them have extremely large networks with many hosts.

Class B addresses are identi-

fied with the first two bits set to 10. The next 14 bits identify the network, and the remaining 16 bits identify a host. A possible 16,384 Class B addresses are possible, with addresses 0 and 16,383 reserved for other uses.

Class C addresses begin with

With a seven-bit Network ID, only 128 Class A addresses are available.

a binary 110. The next 21 bits identify the network, and the remaining eight bits identify a host. A total of 2,097,152 Class C addresses are possible, with addresses 0 and 2,097,151 reserved. Class C addresses are generally used for smaller networks, such as local-area networks.

Class D addresses begin with a binary 1110 and are intended for multicasting purposes. Class E addresses begin with a binary 1111 and are reserved for future

use.

All IP addresses are written in what is known as dotted decimal notation, in which each octet is given a decimal number from 0 to 255. For example, network [10.55.31.84] is represented in binary as 00001010 00110111

00011111 1010100. The first bit (0) indicates a Class A address; the next seven bits (0001010) represent the Network ID (decimal 10); and the last 24 bits (00110111 00011111 1010100) represent the Host ID.

Class A addresses begin with 1-127, Class B with 128-191, Class C with 192-223, and Class D with 224-254. Thus, an address of [150.100.200.5] is easily identified as a Class B address.

— Mark A. Miller

Obtaining TCP/IP data

Users interested in obtaining additional information on outstanding information relating to Transmission Control Protocol/Internet Protocol may do so by contacting the Network Information Center, the central repository of Internet information. Publications from the center include the request for comments (RFC), FYI documents and the DDN Protocol Handbook.

The Network Information Center is located at Government Systems, Inc. 14200 Park Meadow Drive, Suite 200, Chantilly, Va. 22021. The center can be reached via telephone at (703) 802-4535 or (800) 365-3642; via facsimile at (703) 802-8376; or via the Internet at 192.112.36.5 (NIC.DDN.MIL).

RFCs may be obtained in hard copy from the NIC for a small fee, or on-line via the Internet. To obtain an RFC on-

line, use the File Transfer Protocol to log onto NIC.DDN.MIL, with name = anonymous and password = guest.

The RFCs are located in subdirectory RFC, file name RFCnnnn.TXT or RFCnnnn.PS. The "nnnn" represents the RFC number — for example, RFC 1175. Both ASCII (TXT suffix) and PostScript (PS suffix) files are available. FYI documents may be obtained in a similar manner. The subdirectory is FYI, and the file names are FYInn.TXT or FYInn.PS.

Other repositories of RFCs are also available. These include FTP.NISC.SRI.COM (directory RFC, file name RFCnnnn.TXT or RFCnnnn.PS) NIS.NSF.NET (directory RFC, file name RFCnnnn.TXT-1) VENERA.ISI.EDU (directory in-notes, file name RFCnnnn.TXT or RFCnnnn.PS).

— Mark A. Miller

Easing move to distributed mgmt.

continued from page 12

Management applications are vital elements of a distributed management system. For example, Racal-Datcom has implemented key applications as functional elements of its RMS. These applications provide network control, performance analysis and information management. The applications perform specific network functions and can be distributed across a network.

The network control application performs control and management functions for physical network segments and provides individual management modules to control network devices, such as modems, data service units (DSU), T-1 multiplexers, bridges and routers. The performance analysis application collects statistics on network traffic and utilization, monitors error rates and response time for local- and wide-area network segments, and performs analysis on operating conditions. The results of the analysis can be viewed in real-time or fed into other management applications for processing later on.

John Scoggin is a network operations supervisor for Delmarva Power & Light Co., which supplies power to 374,000 residents throughout Delaware, Maryland and Virginia. Scoggin uses the RMS to manage a mission-critical, multivendor LAN/WAN network that supports the company's 21 facilities. Via the RMS, he and his 10-person staff can moni-

tor the topology and status of the network — which includes a T-1 backbone, desktop computing equipment and 230 miles of fiber and digital microwave equipment — and pinpoint failures.

"By using Racal's suite of network management tools, we are able to home in on exactly where the problem is," Scoggin says. "That capability is absolutely critical."

HP and Sun have forged relationships with software companies that develop applications — such as network security, performance measurement, inventory control and printing applications — for distributed management systems. These applications can be added to existing OpenView and SunNet Manager installations as needed and are typically easy to install.

According to David Kelly, an information systems analyst for the Federal Reserve Board of Governors, installation of such applications usually takes less than 15 minutes each. Kelly uses SunNet Manager 2.0 to control a network consisting of some 400 users and such devices as bridges, routers and hubs.

SIAC's Segal says there are also a slew of applications available for HP's OpenView. Segal uses OpenView to run a variety of applications to manage more than 250 network nodes. He anticipates that number will soon grow to 2,000.

Relationships between distributed management systems and third-party management application vendors serve a threefold

(continued on page 34)

Easing move to distributed mgmt.

continued from page 33

purpose: They remove the burden from the system vendor for producing distributed management applications; they establish strong product support by cementing a bond between the vendor and application developers; and they stimulate the development of a broad range of applications for the distributed management system. The end users benefit because they will be able to select from multiple vendors when choosing management applications.

A distributed management system's ability to interoperate with existing user applications and external agents that do not employ standard APIs or protocols presents a problem to users. Some of these systems provide developers' tool kits that overcome this shortfall.

For example, HP's OpenView provides an API developers' kit, while Racal-Datcom offers its Agent Management Module developers' tool kit used to add third-party management to the RMS.

Another important ingredient of distributed network manage-

ment systems is a gateway between vendors' products.

Gateways to other systems

The gateway enables bidirectional communication of network management information among management systems, facilitating the integration of distributed management systems with existing management systems.

For example, a user with an IBM Systems Network Architecture network managed by IBM's NetView should be able to communicate management information between NetView and a distributed management system that manages non-SNA segments of an enterprisewide network in order to manage them from a network control center. While NetView manages the SNA segment of the network, the remainder is managed by a distributed management system.

These needs can be satisfied by a system gateway application running on a network server. The leading developers of distributed management systems have addressed this problem, and at least four — HP, Novell, Racal-Datcom and Sun — offer gateways to NetView, enabling managers of SNA networks controlled by NetView to monitor and control

these distributed network management systems.

A gateway also serves to support communication of management information between a distributed network management system and a third-party element management system used to control a specific internetworking device such as an intelligent hub. Hub vendors, such as Cabletron Systems, Inc. and SynOptics Communications, Inc., typically provide their own hub management system but enable their hubs to be managed by third-party enterprise management systems — such as NetView — using SNMP, CMIP or CMOL management protocols.

Standard user interface

A consistent, easy-to-use interface between users and management applications is a key user asset and a requirement for open systems. It eliminates the need to retrain users for each user interface. It also enables developers to write applications using a single user interface, eliminating the additional effort and cost of developing a separate user interface for each application.

GUIs are commonly employed because they operate in an easy-to-use point-and-click environ-

ment. There are four major GUIs being used by distributed network management systems: OSF's Motif, X Window System, Microsoft's Windows and IBM's OS/2 Presentation Manager.

OSF's Motif, released in July 1989 and based on the X Window System, runs on over a hundred different hardware platforms, including DEC VAX, Sun scalable processor architecture, MIPS Computer Systems, Inc. R2000/3000, Intel Corp. 80X86 and i860, and Motorola, Inc. 680X0 and 88000 processors. It uses a single API for all platforms that support OSF's Motif.

Within the leading developers of distributed management systems, DEC's Polycenter SNMP Manager, HP's OpenView and Racal-Datcom's RMS all support OSF's Motif.

In addition to Motif, RMS supports Microsoft Windows and OS/2 Presentation Manager.

According to many users, the GUI is a vital part of the management system since they depend on it to show the real-time status of the network, alert them to degrading or failed network devices, and pinpoint network problems so they can be resolved quickly.

"We have had the Racal RMS

installed for two years without a system crash," says Mike Gilmore, telecommunications manager for Sunkist Growers, Inc., which has an international network consisting of more than 800 user stations, Ethernet LANs and WAN links supported by DSUs/channel service units, modems and T-1 multiplexers. "The system manages all network elements, which are displayed on the console network map. Network failures can be easily pinpointed on the network map down to the element module level, enabling the failure to be quickly resolved."

GUIs are important for other users, too. Gerald Geisler, a network engineer at Boeing Computer Services, says his DEC Polycenter SNMP Manager not only maps the status of network devices, but also indicates the status of each interface on the device, which is important to pinpoint a failed or degrading component.

Network security

Because network resources are vulnerable to unauthorized access, they must be protected by adequate security measures. This is even more important for distributed management systems. No one wants an unauthorized

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user breaking into the management system and shutting down the entire network or just certain nodes.

Therefore, a distributed management system must prevent security breaches through user authentication and access control, such as user profiles and restrictions.

Vendors are implementing network security methods in various ways, such as passwords, user authentication and access control within the management system, within the server operating system or as a separate application.

The OSF's DME will use the Kerberos authentication system developed by MIT's Project Athena and some HP security components.

Kerberos uses an encryption approach to authentication. It remains to be seen whether distributed management vendors employ Kerberos or a variation of it in future product revisions.

Final evaluation

It's clear that distributed network management systems are the wave of the future when it comes to managing complex, heterogeneous, enterprisewide LAN/WAN networks, and any

evaluation of them must be done carefully.

Distributed management systems promise to provide the pieces that are missing in centralized management systems as well as the flexibility to distribute management applications throughout the network.

These distributed management systems are in their infancy and will continue to grow more powerful with new software releases that add management applications, standard APIs and protocols as they become available.

For instance, many distributed management system vendors are likely to add support for applications built to comply with the OSF's DME or at least incorporate support for DME standards into their products.

So, while it is tough to evaluate distributed management systems today, things could get a little more hairy in the future when users will have to consider how well a product supports the DME on top of all its other features. ■

Axner is a consultant and president of DAX Associates, an Oreland, Pa.-based consulting firm specializing in inter-networking and LAN security.

A distributed mgmt. system blueprint

Cobbled together from technologies submitted by a mix of Open Software Foundation, Inc. members, the OSF's Distributed Management Environment (DME) provides a standard blueprint for building a distributed management system.

DME includes several components, each addressing a specific task. On the user end, DME calls for the use of a consistent graphical user interface (GUI), which simplifies the use and development of management applications. A standard GUI shared by multiple applications makes it easier for network operators to navigate their way through management chores and eases application development.

DME also includes a set of basic services that can be built into applications, including software license management, network software revision management, distributed printing services and host system management.

At the core of DME is a standard method for defining managed resources as software objects. Managed resources

include hardware devices such as routers and software such as management applications. Objects are stored on Object Servers and registered for use by DME applications through Management Request Brokers (MRB). Two MRBs form the DME's nucleus.

The first, Hewlett-Packard Co.'s Postmaster, enables a DME application to access an object capable of retrieving information from a network device or issuing a command to the device via the Simple Network Management Protocol or the Open Systems Interconnection's Common Management Information Protocol.

DME applications pass requests to the Postmaster MRB, which uses a directory service to locate the target object and forwards the request to that object.

The second MRB enables applications written in ANSI C language to invoke object subroutines, called methods, by sending messages to an object server. This is done through Tivoli Systems, Inc.'s objcall, an

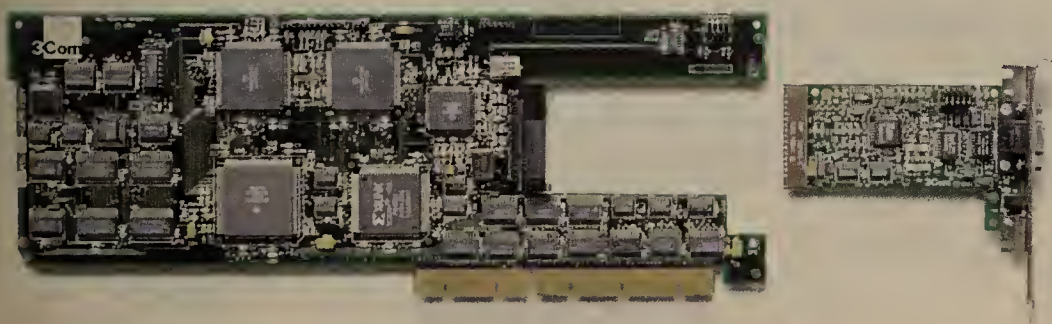
ANSI C application program interface (API). When a message is received from an application, the MRB locates the object and forwards the message. The object then invokes the method. A C++ API based on IBM's Data Engine will be supported in a later DME version.

DME will support two object servers, one based on Tivoli's WizDOM and, later, one based on IBM's Data Engine. The Tivoli object server accommodates object methods written in ANSI C, shell script language or a user-specified language. IBM's Data Engine will support object methods written in C++ or a specialized fourth-generation language called the Object Implementation Language.

Work continues on DME as the OSF seeks to provide a standard method for doing configuration management and managing such network components as databases. When completed, DME will serve as a model for open distributed net management that vendors can emulate.

— David Axner

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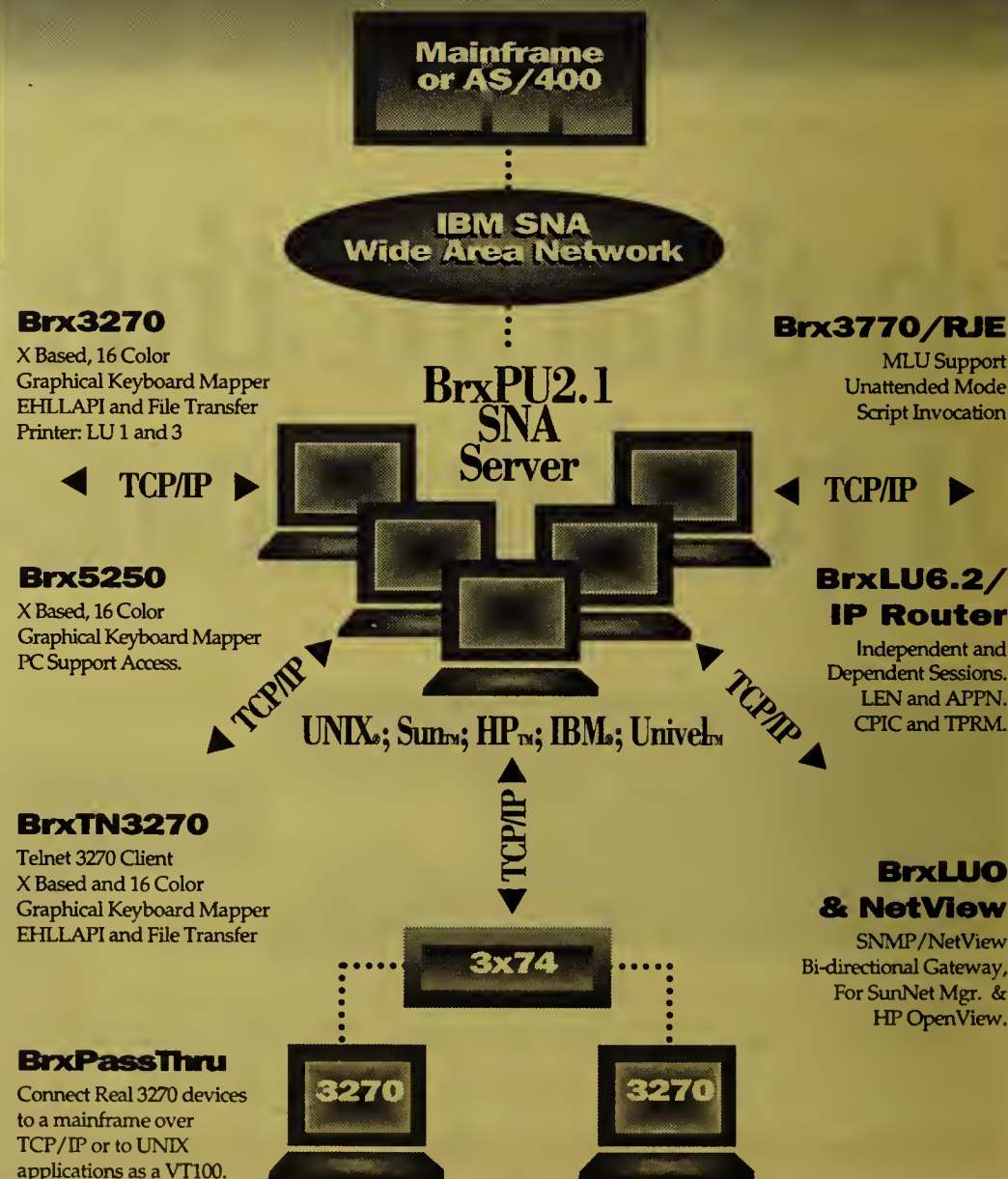
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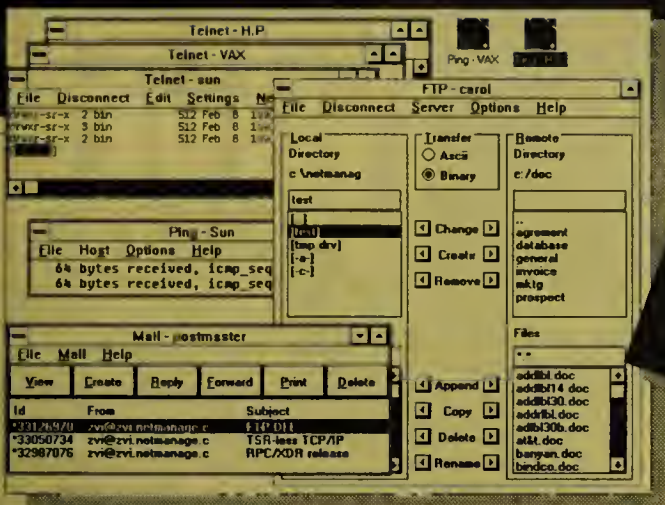
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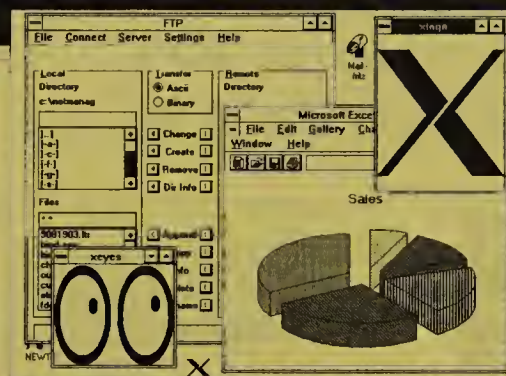
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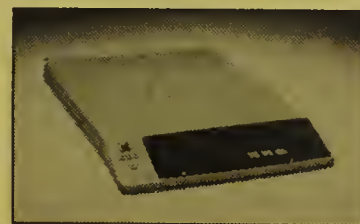
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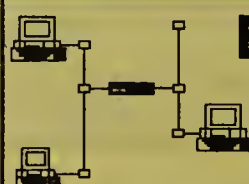
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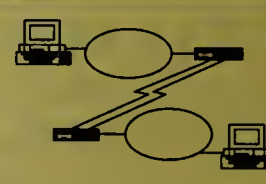
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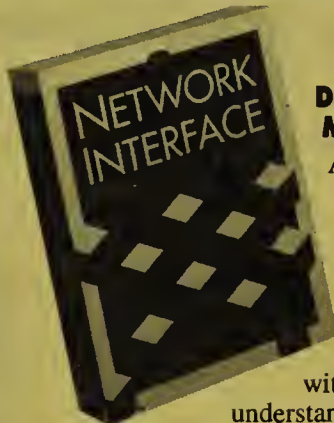
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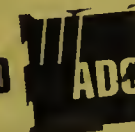
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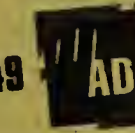
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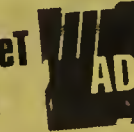
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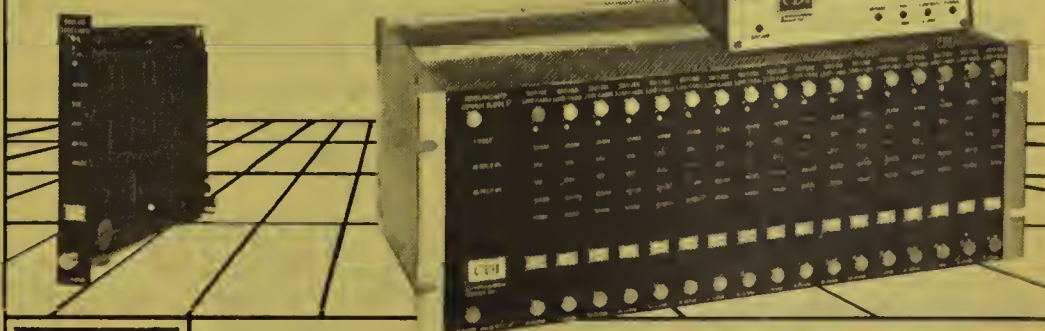
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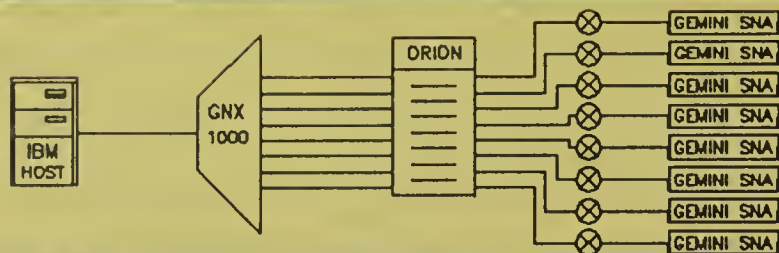
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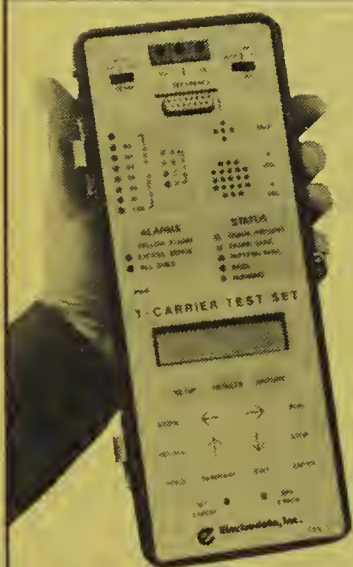
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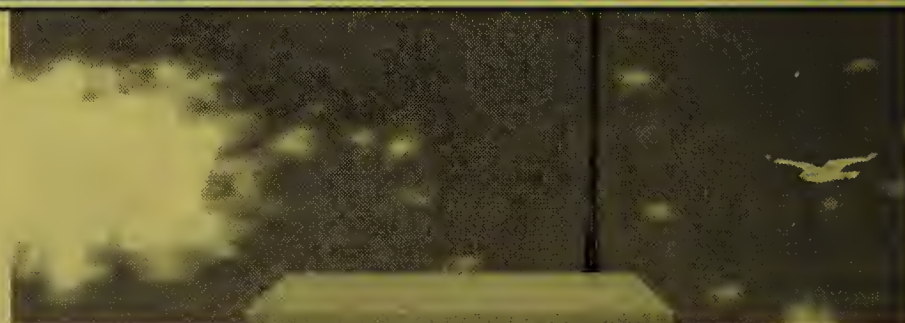
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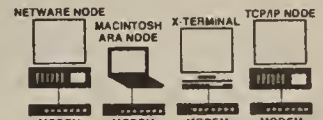
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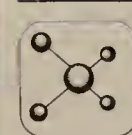
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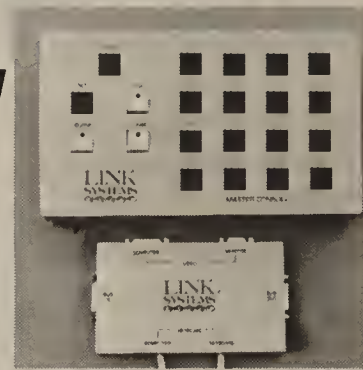


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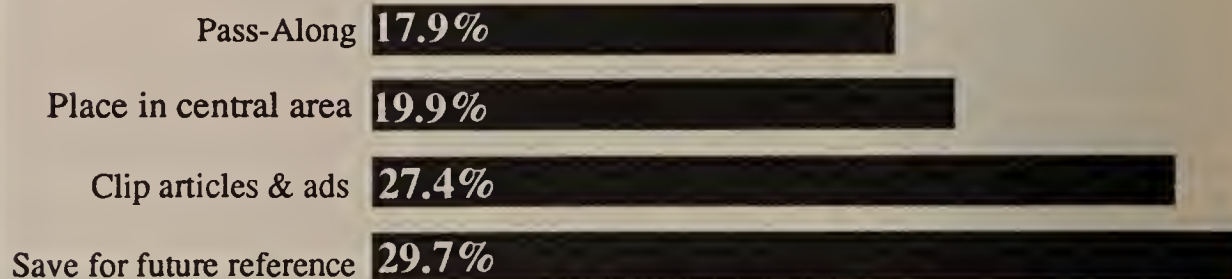
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SOURCE: Network World Duplication Study

UPS selects IBM's router for net

continued from page 1

terminal-to-host sessions.

"We're installing routers in our network to provide our users with any-to-any connectivity," said John Bruno, UPS telecommunications analyst. UPS district offices will then be able to communicate with one another without routing network traffic through SNA hosts at data centers here and in Paramus, N.J.

UPS selected IBM in part because it could deliver APPN support faster than its rivals, Bruno said. "The features that IBM brought to the table today were what we require in the short term," Bruno said. "The other two vendors are announcing those in later releases. We plan to migrate our network to a full-blown APPN network as it evolves. That is our migration path."

The company was also impressed with the 6611's support for SNA class-of-service features,

which let users assign different levels of priority to various types of data, and with IBM's DLS technology.

DLS supports the transmission of SNA data across Transmission Control Protocol/Internet Protocol networks and lets routers locally acknowledge receipt of SNA frames on behalf of remote devices. Those features help save wide-area network bandwidth and preserve SNA sessions.

In the U.S. and Canadian portions of UPSnet, UPS uses Network Equipment Technologies, Inc. T-1 multiplexers at eight regional switching sites. Another 50 or so locations house Northern Telecom, Inc. packet switches that feed traffic into the muxes from surrounding offices, distribution centers and package sorting facilities. Traffic feeds into data centers here and in Paramus.

UPS will install 260 to 300

routers by midyear and another 100 to 140 by year end in sites that today are linked into the backbone via LAN bridges and leased 56K bit/sec circuits. IBM Token-Ring LANs running Novell, Inc.'s NetWare are situated at

UPS selected IBM in part because it could deliver APPN support faster than its rivals.



each site, Bruno said.

The company will use a mix of 56K and 256K lines to link each router to at least one backbone node.

With the routers in place, data from any site can travel directly to any other site, rather than go through one of the data centers as

is required with the bridged network.

The routers will support traditional SNA, APPN, TCP/IP and Novell Internetwork Packet Exchange (IPX) protocols. All traffic will be encapsulated in TCP/IP, and the routers will communicate via the Open Shortest Path First protocol.

In the second phase of the UPSnet upgrade, scheduled for 1994, UPS will investigate upgrading the remaining 800 domestic sites with 56K bit/sec access circuits and low-end routers, according to Bruno. Those sites now use 9.6K bit/sec lines and bridges.

UPS is evaluating low-end offerings from IBM and others, including routers from Novell and Eicon Technology, Inc. that run on a file server, obviating the need for a dedicated personal computer-based device.

Information on the networking needs of UPS' international sites is still being gathered, Bruno said. □

MCI, SunConnect
team on mgmt.

continued from page 10

gram interface to LU 6.2. Like the SunLink SNA 3270/RJE product, the SNA Peer-to-Peer offering also has been improved to support Ethernet and FDDI in addition to token-ring LANs.

The SunLink product enhancements will be ready within 90 days.

In an unrelated announcement, SunConnect offered to replace users' discontinued Lexcel Lance+ SNMP management systems for free. SunConnect is offering a replacement package consisting of SunNet Manager 2.0 and application software from DeskTalk Systems, Inc., a Torrance, Calif., partner of SunConnect.

Both Concord Communications, Inc. and Hewlett-Packard Co. have also rolled out Lance+ replacement offers.

For more information, call (800) 241-2669. □

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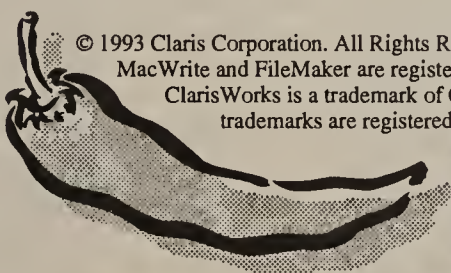
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Novell shifts field with 4.0

continued from page 1

as built-in file and print services. Unix is staking claim to corporate applications turf, and OS/2 — while it has not yet had the momentum or support IBM hoped for — is a powerful option for next-generation applications.

With the desktop becoming so much more powerful and feature-rich, why bother buying a NOS?

NetWare 4.0 is Novell's an-



Behind the scenes at 4.0's debut.

swer to that question. Rather than extolling 4.0 as the next-generation file- and print-sharing system, Novell is positioning it as a service platform second to none — a robust software layer providing a wealth of capabilities for applications developers and users of NT, OS/2, Unix or whatever.

As desktop operating systems become more like NOSes, Novell is shifting the playing field and trying to make NetWare the overriding service glue that bonds a variety of desktops and servers.

"Novell is not in the application business; we rely on developers to build the applications," said Robert Young, director of marketing for Novell's NetWare Systems Group in Provo, Utah. "Our strategy revolves around the application services."

"Novell doesn't care what platform the application is built on — DOS, OS/2 or NT. They just want you to use their services,"

said Robert Gill, analyst at Gartner Group, Inc., a research and consulting house based in Stamford, Conn. "Nobody offers as wide a range of services."

Services, development tools

Perhaps the most important new service in 4.0 is NetWare Directory Service (NDS), a global, distributed, replicated database built into the system itself. NDS maintains information on every network component, including users, groups, printers, volumes and all services.

NetWare 4.0 adds new document imaging, security and auditing services and Novell is vowing to deliver software distribution, electronic software licensing, telephony and multimedia services. These are in addition to the file, print, database and messaging services

Novell now offers.

What's more, Novell is doing everything in its power to make it easy to develop applications that take advantage of those services.

With NetWare 4.0, expected to be available by the end of this month, Novell will release a cross-platform application program interface (API) that will let developers build a single application to run across multiple environments.

Previously, a developer had to buy a separate software developers' kit (SDK) for DOS, OS/2 and Unix, and build different versions of the same application for different environments.

With the cross-platform API, developers today can buy a single SDK to develop for DOS, OS/2

and Microsoft Windows. By the end of the year, Novell will add Unix, Apple Computer, Inc. Macintosh and Windows NT capabilities to enable developers to build in any of the six environments using a single API.

Through its agreement with HyperDesk Corp., Novell also plans to offer a Distributed Object Management System that will let developers build applications using object-oriented technology.

The client side

Novell is also making life easier for client-side developers. With the release of NetWare 4.0, Novell last week released new NetWare clients for DOS, Windows and OS/2 as well as a beta version of a Windows NT client (see "NT and NetWare meet," this page). Novell also discussed details of its Universal Client and its Virtual Loadable Module (VLM) architecture.

According to Willie Tejada, director of developer relations at Novell, Universal Client is Novell's plan to support a "universal" method for all client requesters to access NetWare services, a move that would ease application development. The plan covers requesters for all clients — including Macintosh and Unix, which are now supported through the server.

The new requesters will be built to Novell's new VLM architecture. Similar to the NetWare Loadable Module concept, the VLM architecture will let third-party developers build client-based terminate-and-stay-resident (TSR) programs to add value to clients.

Users will not have to worry about memory restrictions with

TSRs because the VLM architecture will offer the capability to "swap" programs on demand. Each VLM in use will only take the memory footprint allotted to the NetWare shell. "The key is letting developers add functionality without taking up memory," Tejada said.

Successful dominance

Analysts said Novell will likely be successful in its quest for dominance in the services arena. There are not many competitors with as much clout and fewer with the breadth of services.

For its part, Novell sees the

new NetWare as an enabler of future applications.

"Collaborative applications — applications where customers work together to achieve a common goal — are the next generation. These applications are not mainstream because the services aren't there," Tejada said. "By putting these services in NetWare, we're putting them in the mainstream."

NetWare 4.0 will begin shipping by the end of this month. It will be available in 5-, 10-, 25-, 50-, 100-, 250-, 500- and 1,000-user versions, ranging in price from \$1,395 to \$47,995. **■**

NT and NetWare meet

While Windows NT and NetWare 4.0 fight it out for the hearts and minds of network administrators, Microsoft Corp. and Novell, Inc. are working behind the scenes to make their respective environments work together.

Since late January, Novell has offered a prerelease version of a redirector designed to let Windows NT clients work with Novell NetWare networks. The NetWare redirector is "tightly integrated" with Windows NT and will be a "universal client," able to talk to NetWare 4.X, 3.X, 2.X and NetWare Lite, said Bob Ross, a senior development manager at Novell.

Novell is updating the redirector to work with the new Beta 2 version of NT released last week. The new redirector should come out this month.

Ross said that when the final version ships — shortly after the release of Windows NT — the redirector will support an unlimited number of server connections, autoreconnect for

restoration of failed network connections, packet bursts for increased throughput and mutual logon with Windows NT servers.

The redirector will be transport-independent, support Windows NT's integrated cache manager and offer special services for mobile users. Ross said Novell and Microsoft are talking about bundling the redirector with Windows NT but final packaging has yet to be determined.

Also last week, Novell announced a modification in its Open Data Link Interface local-area network driver specification that will let 32-bit drivers written to support NetWare 4.0 also work as client drivers for Windows NT on the Intel Corp. platform.

By not forcing developers to split their efforts, the new specification will allow adapter vendors to create better, more reliable drivers in less time. Ross predicted that more than 250 LAN drivers will be available for Windows NT by the time it ships.

— **Frederic Paul**



Novell's John Edwards

IBM revving up databases

continued from page 1

transaction. Multisite update capability is also defined as distributed unit of work (DUOW) within IBM's Distributed Relational Database Architecture, which defines methods for accessing IBM relational databases.

"[DUOW] is a must for IBM," said Shaku Atre, president of Atre Associates, Inc., a consulting firm in Rye, N.Y. "If they had begun deploying DUOW three years ago, they would have taken a bigger piece of this market."

Database vendors such as Oracle Corp. and Ingres Corp. have implemented multisite update in their Unix databases using two-phase commit, leaving IBM in catch-up mode.

Analysts agreed that IBM is making an unfortunate choice in initially deploying a multisite update capability for DB2 mainframe databases. They said the announcement will give potential customers the impression that IBM is still mired in selling mainframes and not fully committed to client/server computing.



"One thing IBM doesn't need at this point in time is the perception that they are trying to keep users on the mainframe," said Richard Finkelstein, president of Performance Computing, Inc., a database consultancy in Chicago.

Finkelstein said IBM is unlikely to deploy multisite updates on client/server platforms, such as

OS/2 and AIX, until next year.

To show its commitment to client/server computing, IBM will formally unveil a Unix database for its RS/6000 processors. The new database, called Database 2 AIX/6000 (DB2/6000), is intended to help IBM compete in the client/server market against Informix Software, Inc., Oracle and Sybase, Inc. Their databases have been snapped up by downsizing users.

IBM officials said the DB2/6000 database, which has been demonstrated informally at several trade shows, will offer the same security, data integrity, backup and recovery features as other Unix relational databases. They added the AIX database has done well in benchmark tests and will be competitive on a price/performance basis, although IBM

would not disclose pricing.

The new database will be the first from IBM to support the SAG/CLI, which defines a standard way for applications to issue requests to SQL databases.

"Supporting SAG/CLI makes it much easier for developers to hook their front-end tools to DB2/6000," Finkelstein said.

IBM will showcase several developers committed to deploying applications using the DB2/6000 databases, including Platinum Technology, Inc., which makes financial applications, and Uniface Corp., a maker of high-end application development tools.

Industry analysts speculated that Information Builders, Inc. (IBI) will join IBM in announcing support for IBM's previously announced 32-bit OS/2 database, called DB2 for OS/2 (DB2/2).

IBI is expected to announce an extender product that will provide DB2/2 database clients access to information stored in non-IBM and non-SQL databases.

Rounding out its announcement, IBM will release a new version of the Data Propagator for MVS mainframes, which now supports selective two-way replication of data between DB2 and IMS databases on MVS mainframes. Previous releases only allowed users to transfer or replicate IMS data to DB2 databases.

Finally, IBM will announce that its Common Data Facility (CDF) tool for MVS mainframes is being folded into the Information Warehouse framework. As such, the CDF will enable users to track and locate data stored anywhere in Information Warehouse computing environments. **■**

Net features shine as NT nears reality

continued from page 1

the new operating system.

The Windows NT Beta 2 is "very functional, very usable and, hopefully, very close to what we will finally ship. We're on the final lap," Paul Maritz, senior vice president of Microsoft's systems division, told a crowd of developers at a Microsoft technical conference here.

"The focus is on fixing bugs and making it as robust as possible," Gates agreed. "We're not doing any feature optimization and very little speed optimization."

Microsoft claims that release of the new beta version means the commercial release of Windows NT is still on track for shipment in the second quarter of 1993. However, Gates said only that NT will "ship in the middle of the year, but that's all dependent on feedback from the so-called Beta 2 release."

Windows NT will come in two versions and Beta 2 packages of each have been released. Windows NT 3.1 will include features for high-end personal computers and workstations, such as security, support for multiple processors and basic fault tolerance. Windows NT Advanced Server will offer the complete set of NT functionality, adding advanced network services, centralized administration and, eventually, remote network access and support for Macintosh and OS/2 clients.

Windows NT Advanced Server, which includes LAN Manager for Windows NT, had not been in general beta before, said Mike Nash, Windows NT product manager. It gives users a single logon for the entire enterprise, Nash said, using "one account to address a whole company of servers."

A better beta

Networking improvements include automatic detection of network cards — a feature already found in Windows for Workgroups — including configuration of interrupts and memory addresses. Print and file sharing is faster than before, and Beta 2 includes the 32-bit versions of the Mail and Scheduler applications from Windows for Workgroups. The 32-bit network Dynamic Data Exchange is part of the package. Transmission Control Protocol/Internet Protocol support has also been better tested and more closely integrated into NT.

The new beta also includes an "applet" for 3270 terminal emulation, similar to the way Windows 3.1 includes a simple communications program called Terminal. Nash described it as "an entry-level thing" designed to introduce people to 3270 emulation.

Crescendo, NTI partner on FDDI

continued from page 6

(EISA) personal computers and workstations.

The single-attached SBus adapters can be used to connect scalable processor architecture-based workstations and servers to FDDI networks over unshielded twisted-pair or fiber-optic links. Single- and dual-attached MCA adapters are available for connecting IBM RISC System/6000s to

By removing performance bottlenecks, Microsoft says 32-bit applications run as much as 50% faster under Beta 2 than they did on the earlier beta version, while 16-bit Windows applications run up to 333% faster. DOS application performance jumps 250%, while network file I/O is up to 400% faster than before.

That brings NT's performance more in line with Windows 3.1. Overall, Nash said, performance of standard Windows programs under NT is within 5% to 10% of performance under Windows 3.1.

That is important to network administrators. "We're actually fairly excited about the Beta 2 release," said Doug Farmer, head of LAN Administration and Systems Integration of Information Services for Chevron Canada, Ltd. "We intend to implement that for [information systems] users to see how NT performs in an enterprise network."

By building in improved networking capabilities, Microsoft hopes to help Windows NT compete with network operating systems, such as Unix and even Novell, Inc. NetWare. If users are satisfied with their current Windows 3.1 applications, Gates said, they should stick with it. But if you are downsizing applications, "you need Windows NT," he added.

"The line between standard operating systems and network operating systems is [becoming] invisible," Farmer said. "Products like Windows NT and Windows for Workgroups eliminate those barriers."

Microsoft plans to sell 1 million copies a month of NT, Gates said. While smaller than current sales of Windows 3.1, that's still five times Unix sales. Windows 3.1 is selling almost 1.5 million copies a month.

The release version of Windows NT will cost \$495, Gates said, although it was unclear if that will hold for both the workstation and server versions. Upgrades will be available for \$295, and for volume buyers, upgrade prices could go much lower.

In addition to the Systems Network Architecture terminal emulation in the Beta 2, Microsoft is working on SNA Server technology for NT that will ship within 60 to 90 days of the operating system's commercial release. A beta version is due to ship in April, said Vesa Suomalainen, a Microsoft product-line manager.

The SNA Server product will provide a gateway to IBM systems from LAN-attached Windows workstations and will be "amazingly close" to Novell's NetWare for SAA gateway product, Suomalainen said.

At INTEROP 93 Spring, Microsoft demonstrated Hermes, its NT-based network/PC management system. Although the demonstration did not include new features, it was the first time the company has shown Hermes using live code. ☐

FDDI networks over copper and fiber connections, while similar single- and dual-attach cards are available for EISA machines.

The adapter cards will be available next month. Pricing will be announced then.

Also in the initial rollout was X-DDI Manager, a management application that can be used stand-alone on any SPARCstation, RS/6000 or Hewlett-Packard Co. Apollo 700 or with any SNMP management system to monitor and control X-DDI products. Available next quarter, pricing has not yet been determined. ☐

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IBM to issue APPN package

continued from page 5

themselves without infringing on any IBM patents.

IBM issued the first intellectual property package to Data Connection, Ltd. (DCL), a London-based software developer. DCL announced the agreement at last week's INTEROP 93 Spring and unveiled the first non-IBM-developed APPN NN implementation ("U.K. firm to deliver APPN code for OEMs," *NW*, March 1).

The product, SNAP-APPN, is portable APPN NN and End Node (EN) code that vendors can implement in their own products. APPN NNs handle routing and directory functions in an APPN net, and ENs are APPN session end points.

"We are now free to market our products to other vendors who want to build APPN products," said Ian Ferguson, managing director of DCL. "The good news for users and vendors is that there is some competition now."

With the new intellectual property package, IBM has made it easier for vendors to get APPN products out the door. This is a key weapon in APPN's battle to curb the popularity of the Transmission Control Protocol/Internet Protocol, analysts said. Plus the new package takes away one of the spears the rival APPI Forum used to throw at IBM over APPN licensing fees.

Cisco formed the APPI Forum last August to develop an alternative technology to IBM's APPN. APPI supports APPN ENs but keeps TCP/IP as the wide-area protocol rather than Systems Network Architecture/APPN.

IBM unveils MPTN wares

continued from page 8

port will also be added to the Application System/400 minicomputer, although IBM would not say when.

In terms of third-party backing, Apple Computer, Inc., Ki Research, Inc., Oracle Corp., PeerLogic, Inc., Proginet Corp., Rabbit Software Corp. and Systems Strategies, Inc. announced support for MPTN. However, only Ki Research has signed a formal contract with IBM to build MPTN products.

"We intend to use our third-party MPTN vendors to build MPTN products for protocols we don't have much expertise with, such as DECnet," Pozefsky said.

For DECnet support, IBM will turn to Ki Research, which will develop MPTN-based applications that will let users ship data

One of APPI's most attractive features was that products using the technology would be developed by a variety of vendors and APPI specifications would be available at no cost.

Squabbles over the licensing fee for APPN NN have hung like a black cloud over APPN, threatening to undermine its market acceptance. But some industry observers see that cloud dissipating now that there are alternative ways to license APPN NN.

"This package is the gun IBM can hold to the head of the APPI Forum," said Frank Dzubeck, president of the Communications Network Architects, Inc. consultancy in Washington, D.C. "Nobody should be able to complain now because IBM covers most of the bases with this package."

APPI leaders seemed unfazed by the IBM APPN developments.

"We are committed to APPI, and we have a commitment to license IBM NN source code, which we expect to conclude negotiations for soon," said Michael Zaidikian, product manager for Cisco's SNA products. "The users will decide, but we see APPI as a solution for multiprotocol router environments and APPN in more traditional SNA environments."

According to Dick Boyle, program director for local-area communications at Gartner Group, Inc., a consultancy in Stamford, Conn., "Industry perception has been that APPN Network Node was a closed architecture. With the DCL announcement and this technology licensing package, IBM is opening up and trying to rid itself and APPN of that image."

IBM is also in the midst of forming an APPN forum, which is

from DECnet applications over SNA nets.

The first Proginet MPTN application will let OSI File Transfer, Access and Management users exchange data across an SNA network.

Jim Van Every, manager of server interconnect for Boeing Computer Services, said his company has already reduced the number of different protocols in its net from 17 to eight and plans to use MPTN to reduce that number even further.

"We think MPTN will help in our long-term strategy to simplify our network," Van Every said. "I also want to convince other vendors to implement this technology as well because it will make life easier if they do."

MPTF for OS/2 will cost \$150 per user. MPTF for the MVS/ESA mainframe will be available for a monthly charge of between \$254 to \$2,350, depending on the size of the processor. **■**

expected to include most of its third-party APPN partners such as Apple Computer, Inc., Network Equipment Technologies, Inc. and 3Com Corp.

The APPN Forum would promote the standardized development of APPN products and technologies. IBM is expected to reveal further details about the forum at an APPN Implementors

HP to release OpenView version

continued from page 5

the new feature, OpenView will automatically discover network devices and generate a map.

HP will also port a miniversion of the Node Manager from the Unix OpenView to the Windows version. The Windows-based Node Manager will be a Management Information Base (MIB) Browser that lets administrators monitor MIB variables on network devices.

The new version is also expected to have a built-in application builder that will tie in to Microsoft Corp.'s Visual Basic application development tool. This will make it significantly easier to develop OpenView for Windows applications. Also, the system will have a new alarm manager, although the source would not provide further details on this

FCC tries to head off hikes

continued from page 5

AT&T users will have from May 1 to Aug. 1 to decide whether they want to terminate their Tariff 12 deals without penalty and move traffic to another carrier.

During that three-month period, known as "fresh look," AT&T will not be allowed to charge customers rates above those paid in their Tariff 12 deals. If a user is still transitioning traffic to another carrier after Aug. 1, AT&T may be able to charge higher rates by moving the customer to a month-to-month tariff.

Members of the Custom Network Service Users Group, an association of Tariff 12 users, have seen a draft of AT&T's month-to-month tariff and told the FCC that users could pay rates as much as 70% higher than under current Tariff 12 deals.

Three members of the user group, including representatives from Deloitte & Touche, USAir, and AIG, Inc., met with FCC staffers.

The users' concerns arise from rules the FCC put in place last year that allow Tariff 12 customers to terminate their deals and switch to another carrier after 800 portability begins. The FCC was concerned that custom-

Workshop next month.

As expected, IBM confirmed that it is working on requests for comment for carrying APPN data through TCP/IP Sockets interfaces. IBM expects to present a specification at the Internet Engineering Task Force's next meeting describing how SNA/APPN traffic will be handled by TCP/IP Sockets applications. **■**

feature. According to the source, OpenView for Windows is in beta test and will ship in April or May.

As a result of the integration deal with Intel, the LANdesk portion of the new product will be able to feed asset management, virus protection, application monitoring and traffic monitoring information into OpenView for viewing at the management console.

Analysts said the two products seem to be a perfect match.

"All companies can't provide platforms, and they can't all provide applications," said Jamie Lewis, an analyst at The Burton Group, a Salt Lake City consultancy. "It's clear HP is a platform provider and Intel is an application provider. These clear roles are needed to successfully solve net management problems."

LANdesk/OpenView for Windows will be available in June for \$1,995. **■**

ers would be tied into long-term Tariff 12 deals and not be able to take advantage of 800 portability.

Members of the user group said that if AT&T is allowed to bump them off of Tariff 12 deals immediately, users will be unlikely to switch carriers. They told the FCC that no matter how diligent a user is, it will likely take six to nine months to move a Tariff 12 network to a new carrier.

"Subjecting users to dramatically increased service costs during the six months or so that it normally takes to convert a network to a new carrier is likely to render 'fresh look' a nullity," the users told the FCC.

In response, the FCC last week said it would only allow month-to-month tariffs filed by AT&T to take effect after "careful scrutiny."

Rival carriers have also cried foul, claiming AT&T is trying to scare users into staying put. "We see that kind of activity [raising rates during the transition period] as nothing more than a stick-up," said Jim Lewis, vice president of regulatory affairs at MCI Communications Corp.

MCI has filed a formal request at the FCC asking the agency to forbid AT&T from using any type of economic or business threat to attempt to hold onto users. **■**

Users demand more say in ATM products

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Among the organizations seeking to make their views known through ENUR are Amoco Corp., Barclays Bank PLC, the Department of Defense, Hughes Aircraft Co., JP Morgan & Co., Merk & Co., Texas Instruments, Inc. and the University of Colorado.

"We need ATM to survive," said George Buchanan, telecommunications manager for Hughes Business Communications, the network service unit of Hughes Aircraft. "We see ATM as the means of most efficiently and cost-effectively supporting our voice, data and video needs."

The company plans to build a wide-area ATM pilot network by year end, and it hopes to migrate to a global ATM network by 1996. "[ATM products and services] have to interoperate, or the effort will be a waste of time," Buchanan said.

ENUR members did not cite any specific evidence of ATM interoperability problems but expressed the desire to head off such issues before they arise.

"Interoperability should be a given," said Samuel Shuler Jr., communications strategy manager for TI. "It's not something that we, as users, should have to worry about."

Speakers at the meeting stressed the need for a strong user voice in ATM prod-

uct and service development.

"Vendors are under the impression that users have no idea how an ATM infrastructure should be built — and that's a dangerous assumption," said John McQuillan, president of McQuillan Consulting, a Cambridge, Mass., consulting and research firm specializing in ATM. "The network architecture is far too important to be left to vendors and carriers."

Users apparently agree, judging by their response to news of the ENUR formation. "We've heard from over 1,300 users in the last several weeks," said Bud Huber, an ENUR member and strategic planning manager for Hughes Business Communications. "This represents a huge ground swell of user interest in having a say regarding ATM development."

The group is already attracting the attention of vendors, which have pledged to lend it an ear. "We have to find a method for accepting user input as well as delivering ATM [Forum] members' reactions back to the ENUR," said Ifran Ali, a member of the ATM Forum's board of directors.

Bill Pfeiffer, senior vice president with Sprint Corp. and a former network manager with ITT Corp. and Northern Telecom, Inc., echoed Ali's sentiments when he spoke at the ENUR meeting. "Help suppliers and carriers by telling them what you want," he said. "[Users] have to lead the industry instead of letting it lead them." □

3Com delivers on second phase

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in the routing software that will limit broadcasts during specific time frames. Once the assigned threshold is reached, end stations with broadcast traffic are forced to wait before they can send their data.

All new routing enhancements will be delivered in Release 6.0 of the NetBuilder software package, which will be available later this month. Pricing will range from \$750 to \$2,000, depending on the software features provided and hardware supported.

3Com also released some details on the third and final phase of its SNA strategy when it announced its plans to port the Advanced Peer-to-Peer Networking (APPN) code that it licensed from IBM to its new line of token-ring Boundary Routing System Architecture routers.

In addition, the company rolled out a new routing platform for its Boundary Routing technology, a simplified architecture for remote office routers that have one WAN link into a corporate LAN.

The new NetBuilder Token Ring Remote Control router is a two-port device that supports one token-ring interface and one WAN interface at speeds up to T-1. It supports the same protocols as the Ethernet version, including DECnet, Novell, Inc. Internetwork Packet Exchange (IPX) and the Transmission Control Protocol/IP.

Available in the second quarter, it costs \$5,995.

If requirements dictate, the product can be software-upgraded to the new NetBuilder Token Ring Remote Access router, which supports additional protocols, including Open Shortest Path First. It also supports one token-ring and one WAN in-

terface at speeds up to T-1. The Remote Access router will be available in the second quarter for \$6,995.

APPN support for the Boundary Routing platforms is expected by the end of the year. □

NETWORK WORLD

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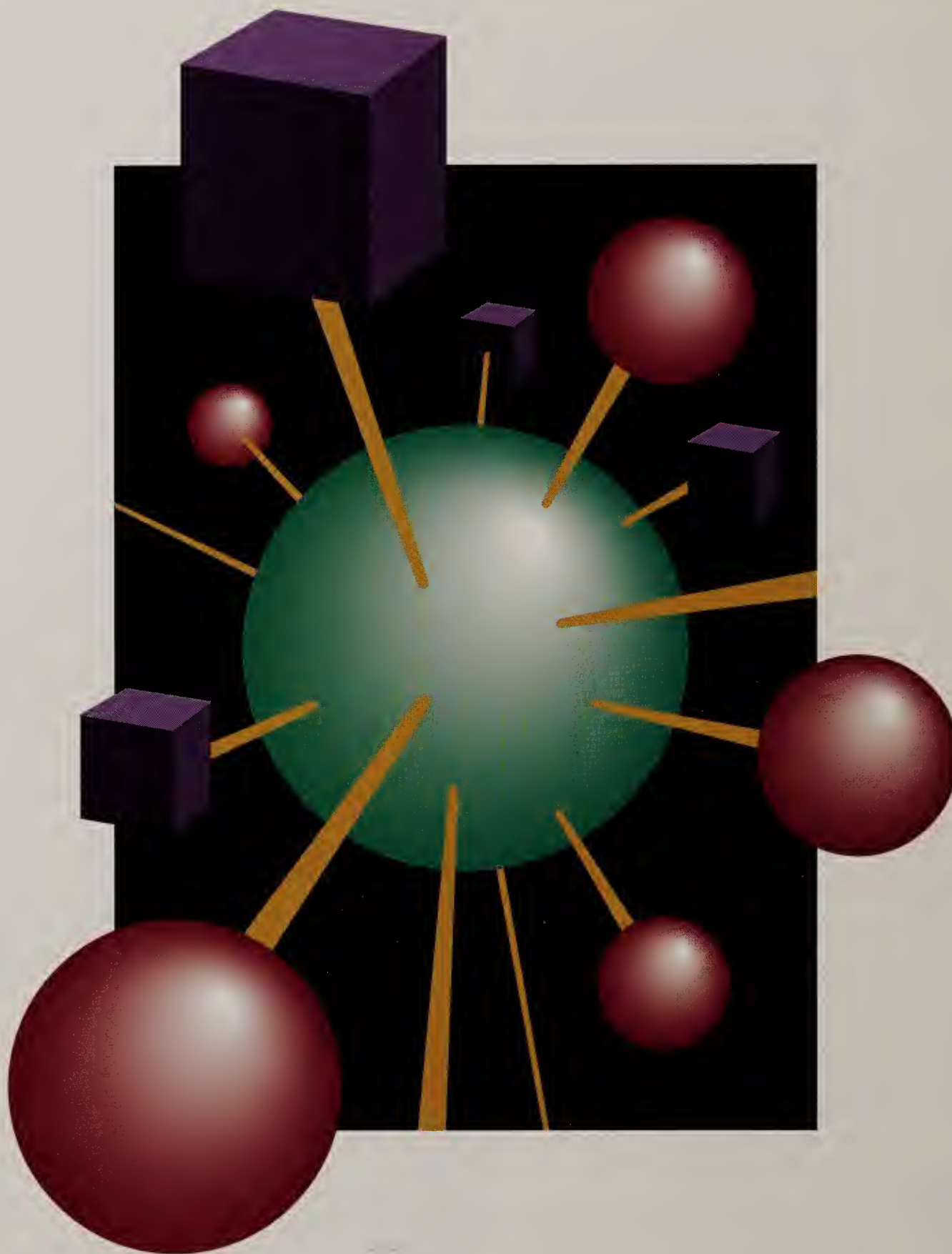
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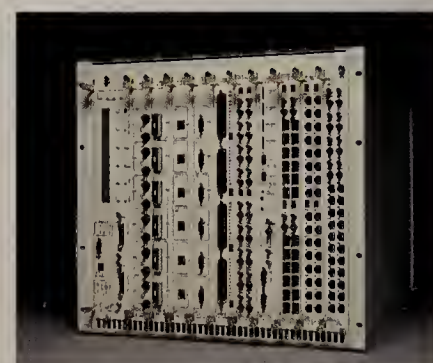
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